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NEW JERSEY DEPT OF ENVIRONMENTAL PROTECTION TRENTON
NATIONAL DAM SAFETY PROGRAM. MILLSBORO POND DAM, (DE00018), DEL-ETC(U)
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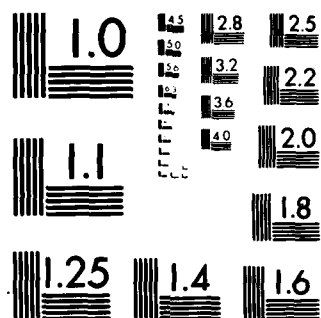
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DELAWARE RIVER BASIN
INDIAN RIVER, SUSSEX COUNTY
DELAWARE

MILLSBORO POND DAM

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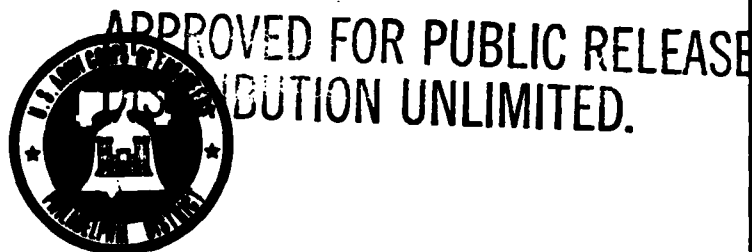
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PHASE 1 INSPECTION REPORT NATIONAL DAM SAFETY PROGRAM

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DEPARTMENT OF THE ARMY

Philadelphia District
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December, 1978

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| 7. AUTHOR(s) Indian River, Sussex County, Delaware. John J. Williams, etc. | | 8. PERFORMING ORG. REPORT NUMBER | | | | | | | | |
| 9. PERFORMING ORGANIZATION NAME AND ADDRESS O'Brien & Gere Engineers Inc. Suite 1760 JFK Blvd. Phila. Pa. 19103 | | 10. CONTRACT OR GRANT NUMBER(s) DACW61-78-C-0052 | | | | | | | | |
| 11. CONTROLLING OFFICE NAME AND ADDRESS U.S. Army Engineer District, Philadelphia Custom House, 2d & Chestnut Streets Philadelphia, Pennsylvania 19106 | | 12. REPORT DATE December 1979 | | | | | | | | |
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| Dams | Visual inspection | | | | | | | | | |
| Dam Safety | Structural analysis | | | | | | | | | |
| Spillway | National Dam Safety Program | | | | | | | | | |
| Riprap | Millsboro Pond Dam, DE | | | | | | | | | |
| 20. ABSTRACT (Continue on reverse side if necessary and identify by block number) This report cites results of a technical investigation as to the dam's adequacy. The inspection and evaluation of the dam is as prescribed by the National Dam Inspection Act, Public Law 92-367. The technical investigation includes visual inspection, review of available design and construction records, and preliminary structural and hydraulic and hydrologic calculations, as applicable. An assessment of the dam's general condition is included in the report. | | | | | | | | | | |



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25 JUN 1980

Honorable Pierre S. DuPont
Governor of Delaware
Dover, Delaware 19901

Dear Governor DuPont:

Inclosed is the Phase I Inspection Report for Millsboro Pond Dam in Sussex County, Delaware which has been prepared under authorization of the Dam Inspection Act, Public Law 92-367. A brief assessment of the dam's condition is given in front of the report.

Based on visual inspection, available records, calculations and past operational performance, Millsboro Pond Dam, a high hazard potential structure, is judged to be in poor overall condition. The dam's spillway is considered inadequate because a flow equivalent to six percent of the Spillway Design Flood -SDF- would cause the dam to be overtopped. (The SDF, in this instance, is the Probable Maximum Flood.) The decision to consider the spillway "inadequate" instead of "seriously inadequate" is based on the determination that dam failure from overtopping would not significantly increase the hazard to loss of life downstream from the dam from that which would exist just before overtopping failure. To ensure adequacy of the structure, the following actions, as a minimum, are recommended:

a. The spillway's adequacy should be determined by a qualified professional consultant engaged by the owner using more sophisticated methods, procedures, and studies within six months from the date of approval of this report. Within three months of the consultant's findings remedial measures to ensure spillway adequacy should be initiated.

b. Within three months from the date of approval of this report, engineering studies and analyses should be initiated to determine the dam's embankment condition and structural stability. This should include subsurface investigations to determine material properties relative to stability and seepage. Any remedial measures found necessary should be initiated within calendar year 1980.

c. The following remedial actions should be initiated within three months from the date of approval of this report:

(1) Riprap should be placed on the upstream slope from the drawdown level (Elev. 0.75) to the top of the dam to protect against erosion.

NAFEN-N

Honorable Pierre S. DuPont

(2) The vegetation on the downstream slope should be cut. Any bushes or small trees should be removed from the embankment.

(3) A regular maintenance program should be developed and implemented.

(4) A downstream warning system should be developed. During periods of heavy rainfall, the dam should be monitored and downstream residents should be alerted in the event of impending failure.

(5) An emergency action plan should be developed which outlines actions to be taken by the owner to minimize the downstream effects of an emergency.

A copy of the report is being furnished to Mr. John E. Wilson III, Delaware Department of Natural Resources and Environmental Control, the designated State Office contact for this Program. Within five days of the date of this letter, a copy will also be sent to Congressman Thomas B. Evans. Under the provisions of the Freedom of Information Act, the inspection report will be subject to release by this office, upon request, thirty days after the date of this letter.

Additional copies of this report may be obtained from the National Technical Information Services (NTIS), Springfield, Virginia, 22161 at a reasonable cost. Please allow four to six weeks from the date of this letter for NTIS to have copies of the report available.

An important aspect of the Dam Inspection Program will be the implementation of the recommendations made as a result of the inspection. We accordingly request that we be advised of proposed actions taken by the State to implement our recommendations.

Sincerely,



JAMES G. TON
Colonel, Corps of Engineers
District Engineer

1 Incl
As stated

Copies Furnished:
Mr. John E. Wilson III, Acting Secretary
Department of Natural Resources and
Environmental Control
Edward Tatnall Bldg.
Dover, DE 19901

Mr. William R. Ratledge, Director
Division of Soil & Water Conservation
DDNR & EC
Dover, DE 19901

MILLSBORO POND DAM (DE00018)

CORPS OF ENGINEERS ASSESSMENT OF GENERAL CONDITIONS

This dam was inspected on 27 September 1979 by O'Brien & Gere Engineers, Inc., under contract to the U.S. Army Engineer District, Philadelphia in accordance with the National Dam Inspection Act, Public Law 92-367.

Millsboro Pond Dam, a high hazard potential structure, is judged to be in poor overall condition. The dam's spillway is considered inadequate because a flow equivalent to six percent of the Spillway Design Flood -SDF- would cause the dam to be overtopped. (The SDF, in this instance, is the Probable Maximum Flood.) The decision to consider the spillway "inadequate" instead of "seriously inadequate" is based on the determination that dam failure from overtopping would not significantly increase the hazard to loss of life downstream from the dam from that which would exist just before overtopping failure. To ensure adequacy of the structure, the following actions, as a minimum, are recommended:

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(3) A regular maintenance program should be developed and implemented.

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(5) An emergency action plan should be developed which outlines actions to be taken by the owner to minimize the downstream effects of an emergency.

APPROVED:


JAMES G. TON
Colonel, Corps of Engineers
District Engineer

DATE:

24 JUN 1980

DELAWARE RIVER BASIN

Name of Dam: Millsboro Pond Dam
County & State: Sussex County, Delaware
Inventory Number: DE 00018

PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM

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Prepared by:
O'BRIEN & GERE ENGINEERS, INC.
JUSTIN & COURTNEY DIVISION

For

DEPARTMENT OF THE ARMY
Philadelphia District, Corps of Engineers
Custom House-2nd & Chestnut Streets
Philadelphia, PA 19106

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PREFACE

This report is prepared under guidance contained in the Recommended Guidelines for Safety Inspection of Dams, for Phase I Investigations. Copies of these guidelines may be obtained from the Office of Chief of Engineers, Washington, D.C. 20314. The purpose of a Phase I Investigation is to identify expeditiously those dams which may pose hazards to human life or property. The assessment of the general condition of the dam is based upon available data and visual inspections. Detailed investigation, and analyses involving topographic mapping, subsurface investigations, testing, and detailed computational evaluations are beyond the scope of a Phase I Investigation; however, the investigation is intended to identify any need for such studies.

In reviewing this report, it should be realized that the reported condition of the dam is based on observations of field conditions at the time of inspection along with data available to the inspection team. It is important to note that the condition of a dam depends on numerous and constantly changing internal and external conditions, and is evolutionary in nature. It would be incorrect to assume that the present condition of the dam will continue to represent the condition of the dam at some point in the future. Only through continued care and inspection can there be any chance that unsafe conditions be detected.

Phase I inspections are not intended to provide detailed hydrologic and hydraulic analyses. In accordance with the established Guidelines, the Spillway Test flood is based on the estimated "Probable Maximum Flood" for the region (greatest reasonably possible storm runoff), or fractions thereof. The test flood provides a measure of relative spillway capacity and serves as an aid in determining the need for more detailed hydrologic and hydraulic studies, considering the size of the dam, its general condition and the downstream damage potential.

PHASE I REPORT

NATIONAL DAM INSPECTION PROGRAM

Name of Dam: Millsboro Pond Dam ID # DE 00018
State Located: Delaware
County Located: Sussex
Stream: Indian River
Coordinates: Latitude 38° 35.7', Longitude 75° 17.5'
Date of Inspection: September 27, 1979

ASSESSMENT

Based on visual observations made during the date of the inspection, information made available by the Delaware Department of Natural Resources and Environmental Control (DNREC), and conversations with the owner's representative, Millsboro Pond Dam (owned by the Delaware State Highway Department) is considered to be in overall poor condition. A partial failure of the dam occurred in February of 1979. On the date of the inspection, it was apparent that temporary repairs had been effected.

The dam is a homogeneous earth embankment approximately 400 feet in length with a maximum height of about 12 feet. The embankment appears to be composed entirely of a relatively pervious material (sandy soil) with no seepage barriers or erosion protection. The upstream slope has eroded to an approximate slope of 1 horizontal to 2 vertical (1H:2V) and appears to be unstable. The downstream slope is overgrown with vegetation.

The recommended Spillway Design Flood (SDF) for this Intermediate size, High hazard dam is the Probable Maximum Flood (PMF). Examination of the results of the hydrologic and hydraulic analyses indicates that the spillway is capable of discharging approximately 5 percent of the SDF prior to overtopping of the embankment. Therefore, the spillway is classified as "Inadequate," but not "Seriously Inadequate" because a failure of the dam would not appear to cause a significant increase in hazard to loss of life downstream.

Recommendations and remedial measures which should be initiated immediately are as follows:

a. Facilities

1. Detailed hydrologic and hydraulic analyses should be performed to determine the need and type of mitigating measures necessary. These analyses should include an assessment of the downstream hazard potential that would result from a failure of the dam with tidal conditions taken into account.

2. Seepage and stability analyses for the embankment should be performed to establish what remedial measures may be necessary to render the embankment safe. The required remedial measures should be constructed following the completion of the analyses.

3. Riprap should be placed on the upstream slope from the drawdown level (Elev. 0.75) to the top of the dam to protect against erosion.

4. The vegetation on the downstream slope should be cut. Any bushes or small trees should be removed from the embankment.

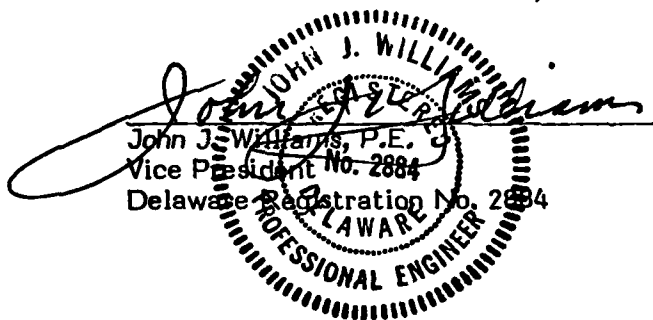
b. Operation and Maintenance Procedures

1. A regular maintenance program should be developed and implemented.

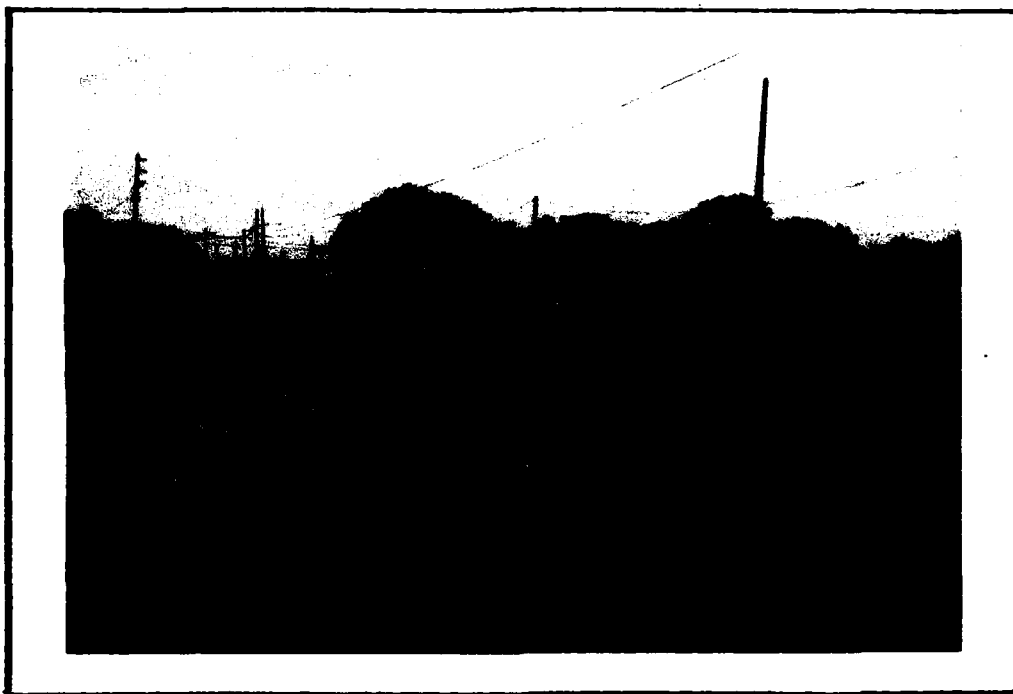
2. A downstream warning system should be developed. During periods of heavy rainfall, the dam should be monitored and downstream residents should be alerted in the event of an impending failure.

3. An emergency action plan should be developed which outlines actions to be taken by the owner to minimize the downstream effects of an emergency.

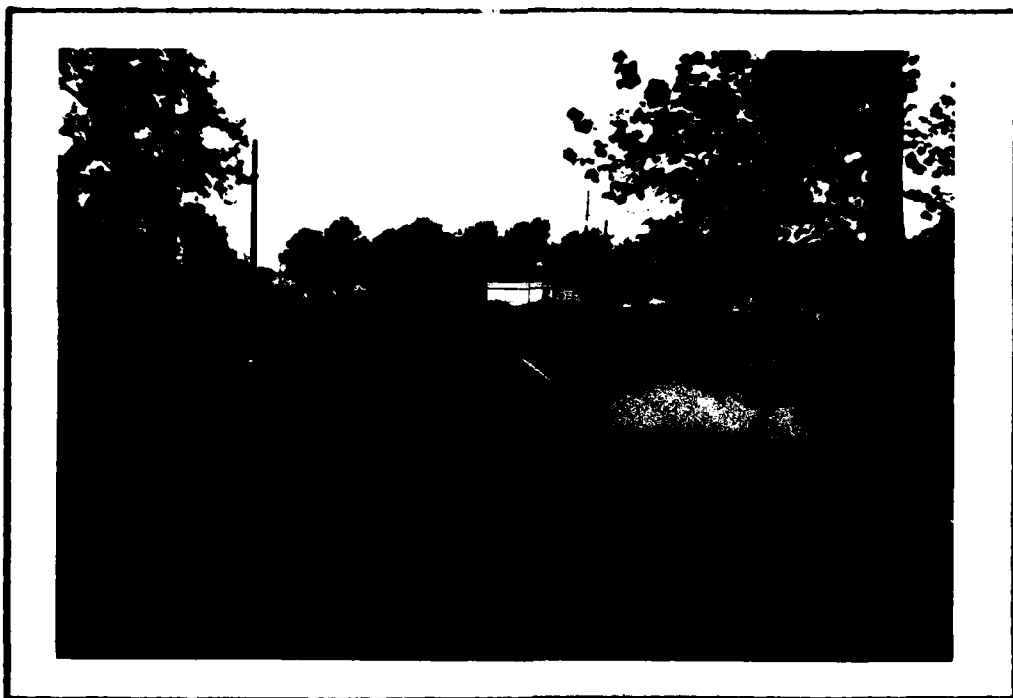
O'BRIEN & GERE ENGINEERS, INC.



Date: 8 FEB 1980



*UPSTREAM FACE OF DAM
AND SPILLWAY SECTION 9-27-79*



DOWNSTREAM FACE OF DAM 9-27-79

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PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM
MILLSBORO POND DAM
INVENTORY NUMBER - DE 00018

SECTION 1

PROJECT INFORMATION

1.1 General

a. Authority. This report is authorized by the Dam Inspection Act, Public Law 92-367, and has been prepared in accordance with contract # DACW 61-78-C-0052 between O'Brien & Gere Engineers and the United States Army Corps of Engineers, Philadelphia District.

b. Purpose of Inspection. The purpose of this inspection is to evaluate the structural and hydraulic condition of Millsboro Pond Dam and appurtenant structures and to determine if the dam constitutes a hazard to human life or property.

1.2 Project Description (Based on information obtained from the Delaware Department of Natural Resources and Environmental Control (DNREC) Dover, Delaware).

a. Description of Dam and Appurtenances. Millsboro Pond Dam is a homogeneous earth embankment approximately 400 feet long with a maximum height of about 12 feet. A 4-lane highway (Delaware Route 24) forms the top of the embankment, which is approximately 60 feet wide.

The spillway is a concrete, sharp-crested weir with a semicircular configuration and a downstream face that is sloped 2H:1V (Refer to Figure 3 in Appendix E). The arc length of the spillway crest is 81.7 feet and the crest elevation is 4.75 (approximately 5.4 feet below the low point in the top of the dam). Stoplog gates that are 4 feet high and 5 feet wide are located at each end of the semicircular weir. Spillway discharge is directed into a 20-foot wide, 8.5-foot high opening (beneath the bridge) which extends approximately 60 feet through the base of the embankment.

The stoplog gates may be operated by hand wheels which are accessible from the top of the dam by means of concrete walkways.

b. Location. Millsboro Pond Dam is located on the Indian River in the town of Millsboro, Sussex County, Delaware. The site is in the northern portion of Millsboro, a community with a 1970 population of 1,073, and is shown on the USGS Quadrangle entitled, "Millsboro, Del" at coordinates N 38° 35.7', W 75° 17.5'. A regional location map of Millsboro Pond Dam is included as Figure 1 in Appendix E.

c. Size Classification. Millsboro Pond Dam has a maximum height of about 12 feet which would place it in the Small size dam category because it is less than 40 feet high. However, since it has a maximum storage capacity of approximately 1,475 acre-feet it is classified as an Intermediate size dam because it has greater than 1,000 acre-feet but less than 50,000 acre-feet maximum storage.

d. Hazard Classification. Three houses (with base elevations of approximately 5.0) are located on the left bank (looking downstream) of the Indian River and a playground is located on the right bank of the river immediately downstream of the dam. The Millsboro wastewater treatment plant is located downstream of the playground. A 4-lane highway (Delaware Route 24) is located across the top of the embankment. A failure of the dam would result in extensive property damage and possible loss of life. Therefore, the dam is classified in the High hazard category.

e. Ownership. Millsboro Pond Dam and its appurtenant structures are owned by the Delaware Department of Transportation, Division of Highways, Dover, Delaware, 19901. According to the owner's representative, the pond is owned by the town of Millsboro.

f. Purpose of Dam. The original purpose of the dam is unknown. The dam presently supports a 4-lane highway and the pond is used for recreation.

g. Design and Construction History. No information is available concerning the original design and construction of the dam. The current spillway system was designed in 1964 by the Delaware State Highway Department. Construction of the spillway was completed in 1966. Following the partial failure of the dam in February of 1979, temporary repairs to the embankment and highway were effected.

h. Normal Operating Procedures. According to Mr. John H. McWilliams, the Sussex County District Engineer for the Delaware State Highway Department, the stoplog gates are only operated to draw the reservoir down for maintenance of the dam or cleaning of the reservoir.

1.3 Pertinent Data

a. Drainage Area.

| | |
|--------------|------|
| Square Miles | 61.5 |
|--------------|------|

b. Discharge at Dam Site (cfs).

| | |
|-------------------|-------|
| Spillway Capacity | 1,190 |
|-------------------|-------|

c. Elevation (feet above MSL).

| | |
|------------------------------------|-------------|
| Spillway crest (normal pool) | 4.75 |
| Top of Dam (maximum pool) | 10.0 |
| Streambed at downstream toe of dam | -2.0 (est.) |

d. Reservoir Length (miles).

| | |
|--------------|-----|
| Normal pool | 1.1 |
| Maximum pool | 2.6 |

e. Storage (acre-feet).

| | |
|--------------|-------|
| Normal pool | 375 |
| Maximum pool | 1,475 |

f. Reservoir Surface Area (acres).

| | |
|--------------|-----|
| Normal pool | 105 |
| Maximum pool | 336 |

g. Dam Data.

| | |
|-----------------|--|
| Type | Earth |
| Length | 400 feet |
| Height | 12 feet |
| Top Width | 60 feet |
| Side Slopes | Eroded to 1H:2V (upstream) 2H:1V (downstream) |
| Zoning | None |
| Impervious Core | None |
| Cutoff | Unknown |
| Grout Curtain | None |

h. Spillway.

| | |
|--------------------|--|
| Type | Semicircular sharp-crested concrete weir with sloped downstream face and stoplog bays on both sides (see Figure 3 in Appendix E). |
| Crest Length | 81.7 feet (arc distance) |
| Crest Elevation | 4.75 |
| Gates | A 4-foot high by 5-foot wide stoplog gate is located on each side of the spillway. |
| Upstream Channel | None |
| Downstream Channel | A 20-foot wide, 8.5-foot high opening beneath the bridge directs spillway discharge through the embankment for a distance of 60 feet where it outlets into the Indian River. |

i. Outlet Works. The outlet works consist of the stop log gates which function as a part of the spillway when closed. These gates are operated by hand wheels that are accessible from the top of the dam by means of concrete walkways.

SECTION 2

ENGINEERING DATA

2.1 Design

a. Data Available. The engineering data made available by the Delaware DNREC consists of a set of 4 design drawings (dated 1964) for the new spillway and the highway.

b. Design Features. The principal design features for this structure are discussed in Section 1.2.a and shown on the drawings in Appendix E of this report.

2.2 Construction

No information relative to the original construction of the dam is available. The spillway system was redesigned and reconstructed between 1964 and 1966.

2.3 Operation

Operational features are limited to the stoplog gates located at each end of the spillway. The reservoir may be drawn down four feet for maintenance purposes by operating these gates. However, the normal high tide elevation of the Indian River (2.5) limits the depth of drawdown during high tide to 2.25 feet below the spillway crest.

2.4 Evaluation

a. Availability. All information made available was provided by DNREC. No information is available concerning the embankment and foundation materials.

b. Adequacy. The information made available by DNREC, conversations with the Owner's representative, and observations made during the field investigation provided adequate data for a Phase I evaluation.

c. Validity. There is no reason to question the validity of the data provided by DNREC.

SECTION 3
VISUAL INSPECTION

3.1 Findings

a. General. The field inspection of Millsboro Pond Dam took place on September 27, 1979. At the time of the inspection, the stoplog gates had been removed and the reservoir water surface was approximately 3.8 feet below the spillway crest elevation. No underwater areas were inspected. The observations and comments of the field inspection team are in the checklist which is Appendix B of this report. The appearance of the facility indicates that the dam and its appurtenances are marginally maintained.

b. Dam. On the date of the inspection, the reservoir level was approximately 3.8 feet below the spillway crest elevation due to a recent failure of the embankment. According to Mrs. Thelma Monroe, the Mayor of Millsboro, a partial failure of the dam occurred in February of 1979 during non-overtopping conditions. The apparent cause of failure was piping through the embankment. The dam has been temporarily repaired since the failure, and a temporary road and bridge have been constructed to accommodate the motor vehicle traffic. Observation of the exposed portion of the breached section indicates that the entire embankment was constructed with a relatively pervious (sandy) material.

The upstream face of the embankment to the left of the spillway (looking downstream) has been eroded to a rather steep slope of approximately 1H:2V and appears to be unstable. The downstream face of the embankment has an approximate slope of 2H:1V and is overgrown with vegetation.

c. Appurtenant Structures. The spillway system appears to be in good condition. According to Mr. McWilliams, the Owner's representative, the stoplog gates were removed subsequent to the failure of the embankment in order to draw down the reservoir.

Two pipes that appear to be located longitudinally through the embankment extend above the top of the dam across the spillway section. According to Mr. McWilliams, the larger of these pipes (12-inch diameter) is a sewer line from a nearby hospital and the smaller pipe (5-inch diameter) is a telephone line from the same hospital. Both pipes were installed less than 10 years ago.

d. Reservoir Area. There is no evidence of excessive siltation, slope instability, or other features that would adversely affect the storage capacity of the reservoir. The slopes along the perimeter of the reservoir are vegetated and on gentle gradients of less than 10 percent.

e. Downstream Channel. The downstream channel is the Indian River which outlets into the Indian River Bay which, in turn outlets into the Atlantic Ocean. Three homes are located along the left bank of the river and a playground and a wastewater treatment plant on the right bank of the river which could be subject to flooding.

SECTION 4

OPERATIONAL FEATURES

4.1 Procedures

The Owner's Representative stated that the stoplog gates had been operated occasionally in the past for maintenance purposes. However, the stoplog gates have been removed since the partial failure of the dam and no operating procedures are currently in effect.

4.2 Maintenance of the Dam

According to the Owner's Representative, maintenance of Millsboro Pond Dam is the responsibility of the Sussex County office of the Delaware State Highway Department, located in Georgetown. However, no established maintenance program has been established.

4.3 Maintenance of Operating Facilities

The only operating facilities associated with this dam are the stoplog gates which have been temporarily removed.

4.4 Description of any Warning System in Effect

No warning systems are in effect at this site.

4.5 Evaluation of Operational Adequacy

A regular maintenance program should be developed and implemented by the Owner.

A downstream warning system should be developed. The dam should be monitored during periods of heavy rainfall, and downstream residents should be alerted in the event of an impending failure.

SECTION 5

HYDRAULICS AND HYDROLOGY

5.1 Evaluation of Features

a. Design Data. No hydrologic or hydraulic design data was provided by DNREC. The design drawings provided spillway dimensions and characteristics upon which the hydraulic calculations in this report were based.

Millsboro Pond has a drainage area of 61.5 square miles. The spillway has an estimated discharge capacity of 1,190 cfs.

For further information, refer to the computations, data, and computer printout included in Appendix C of this report.

b. Experience Data. No rainfall or reservoir level records are maintained for this dam. The maximum reservoir elevation of record is not known.

c. Visual Observations. On the date of the inspection, the spillway did not appear to be susceptible to blockage from debris.

d. Overtopping Potential. The Spillway Design Flood (SDF) for this "Intermediate" size, "High" hazard structure is the Probable Maximum Flood (PMF). The SDF was synthesized from the Probable Maximum Precipitation using the Snyder unit hydrograph. Hydrograph coefficients for this site were obtained from the Philadelphia District, Corps of Engineers. The SDF hydrograph was routed through the reservoir with the initial water surface elevation at the spillway crest. The peak inflow and outflow rates for the SDF were determined to be 41,492 cfs and 40,266 cfs respectively. The spillway is capable of discharging approximately 5 percent of the SDF prior to overtopping of the embankment (refer to Appendix C for computations and the computer printout).

e. Spillway Adequacy. The spillway is considered "Inadequate" since it is incapable of discharging the PMF. The area downstream of the dam consists of a wide tidal area and it appears that the water surface elevations produced by a dam breach resulting from overtopping conditions should not significantly affect the non-breach water surface elevations downstream of the dam.

f. Emergency Drawdown. The reservoir can be drawn down from normal pool (Elev. 4.75) to the base of the stoplog gates (Elev. 0.75) in approximately 45 hours, or about 2 days (see Appendix C for calculations).

SECTION 6

STRUCTURAL STABILITY

6.1 Evaluation of Structural Stability

a. Visual Observations. The embankment appears to have been constructed with a relatively pervious material (sandy soil) with no seepage barriers or erosion protection provided. Therefore, the dam would be highly susceptible to piping through the embankment and erosion of the upstream face due to wave action. The breach that occurred in February of 1979 appears to be the result of seepage through the embankment. In addition, the upstream face (to the left of the spillway looking downstream) has been eroded to an approximate slope of 1H:2V and appears to be unstable.

The downstream slope of the embankment appears to be stable. However, the thick overgrowth of vegetation creates numerous potential seepage paths and hinders a detailed investigation of the condition of the slope.

b. Design and Construction Data. The spillway system appears to have been constructed in general conformance with the 1964 design drawings. No information is available concerning the design and construction of the original embankment.

c. Operating Records. There are no known operating records for Millsboro Pond Dam.

d. Post Construction Changes. The spillway system was redesigned and reconstructed between 1964 and 1966. No record of any other post construction changes is available.

e. Seismic Stability. Millsboro Pond Dam is located in Seismic Zone 1 of the "Seismic Zone Map of Contiguous States." A dam located in Seismic Zone 1 is generally considered to be safe under expected Zone 1 earthquake loading conditions if it is stable under static loading conditions. Seepage and stability analyses are recommended for this site to determine static stability.

SECTION 7

ASSESSMENT, RECOMMENDATIONS, & PROPOSED REMEDIAL MEASURES

7.1 Dam Assessment

a. Safety. The visual observations indicate that the embankment portion of the Millsboro Pond Dam is in poor condition. The deficiencies and problem areas noted in Section 6.1.a are indicative of an inadequate design of the original dam as well as a general lack of maintenance.

The spillway is capable of discharging 5 percent of the SDF prior to overtopping of the embankment. Therefore, the spillway is classified as "Inadequate," but not "Seriously Inadequate" because a failure of the dam would not appear to cause a significant increase in hazard to loss of life downstream.

b. Adequacy of Information. The information made available by DNREC, conversations with the Owner's Representative, and observations made during the field investigation provided adequate data for a Phase I evaluation.

c. Urgency. The remedial measures recommended in Section 7.2 should be initiated immediately.

d. Necessity for Further Investigation. Further investigations should be performed in accordance with 7.2.a, numbers 1 and 2. .

7.2 Recommendations and Proposed Remedial Measures

a. Facilities.

1. Detailed hydrologic and hydraulic analyses should be performed to determine the need and type of mitigating measures necessary. These analyses should include an assessment of the downstream hazard potential that would result from a failure of the dam with tidal conditions taken into account.

2. Seepage and stability analyses for the embankment should be performed to establish what remedial measures may be necessary to render the embankment safe. The required remedial measures should be constructed following the completion of the analyses.

3. Riprap should be placed on the upstream slope from the drawdown level (Elev. 0.75) to the top of the dam to protect against erosion.

4. The vegetation on the downstream slope should be cut. Any bushes or small trees should be removed from the embankment.

b. Operation and Maintenance Procedures

1. A regular maintenance program should be developed and implemented.
2. A downstream warning system should be developed. During periods of heavy rainfall, the dam should be monitored and downstream residents should be alerted in the event of an impending failure.
3. An emergency action plan should be developed which outlines actions to be taken by the owner to minimize the downstream effects of an emergency.

APPENDIX

A

Check List Engineering Data
Design, Construction, Operation
Phase I

CHECK LIST
ENGINEERING DATA
DESIGN, CONSTRUCTION, OPERATION
PHASE I

NAME OF DAM Millsboro Pond Dam

ID # DE 00018

Sheet 1 of 4

ITEM

REMARKS

AS-BUILT DRAWINGS

Four As-Built Drawings were provided by DNREC and are included in APPENDIX E. as figures 2,3,4, and 5.

REGIONAL VICINITY MAP

A regional vicinity map is included in APPENDIX E as figure 1

CONSTRUCTION HISTORY

No construction history information is available.

TYPICAL SECTIONS OF DAM

No embankment cross-sections are available.

OUTLETS - PLAN

There is no system of outlet works for this dam.

DETAILS

CONSTRAINTS

DISCHARGE RATINGS

None Available .

RAINFALL/RESERVOIR RECORDS

None Available.

| ITEM | REMARKS |
|---|---|
| DESIGN REPORTS | None Available |
| GEOLOGY REPORTS | None Available. |
| DESIGN COMPUTATIONS HYDROLOGY & HYDRAULICS DAM STABILITY SEEPAGE STUDIES | None Available |
| MATERIALS INVESTIGATIONS BORING RECORDS LABORATORY } FIELD } | Records of several boreholes are included on Figure 3 in Appendix E. |
| POST-CONSTRUCTION SURVEYS OF DAM | The As-Built Highway elevations are included on Figure 2 in Appendix E. |
| BORROW SOURCES | Unknown |

| ITEM | REMARKS | Sheet 3 of 4 |
|---|---|--------------|
| MONITORING SYSTEMS | NONE | |
| MODIFICATIONS | Plans and Details for the current spillway system, which was designed in 1964, are included in Appendix E as Figures 2,3,4 and 5. | |
| HIGH POOL RECORDS | None available. | |
| POST CONSTRUCTION ENGINEERING STUDIES AND REPORTS | None available. | |
| PRIOR ACCIDENTS OR FAILURE OF DAM DESCRIPTION REPORTS | A breach occurred in February of 1979, but there are no description reports available. | |
| MAINTENANCE OPERATION RECORDS | None available. | |

| ITEM | REMARKS |
|--|---|
| SPILLWAY PLAN | The spillway plans, sections, and details are included in Appendix E as Figures 2,3,4. and 5. |
| SECTIONS | |
| DETAILS | |
| OPERATING EQUIPMENT PLANS & DETAILS | Stop Log Gate Plans are also included on Figures 3,4, and 5 in Appendix E. |
| MISCELLANEOUS | Figures 2,3,4, and 5 in Appendix E were the only information obtained from DNREC. |

APPENDIX

B

Check List

Visual Inspection

Phase I

CHECK LIST
VISUAL INSPECTION
PHASE I

Sheet 1 of 8

Name Dam Millsboro Pond Dam County Sussex State Delaware National ID # DE 00018
Type of Dam Earth Hazard Category High
Date(s) Inspection Sept. 27, 1979 Weather Cloudy Temperature 650 F

Pool Elevation at Time of Inspection 1.0 M.S.L. Tailwater at Time of Inspection 1.0+ M.S.L.

Inspection Personnel:

John J. Williams Leonard Beck Robert Bowers

John J. Williams Recorder

Remarks:

Mr. Krishna Patel, Delaware DNREC, Mrs. Thelma Monroe, Mayor of Millsboro, Mr. Charles West, Delaware State Representative, and Mr. Gene Campbell, County Democratic Chairman for Sussex County, were also present during the inspection.

EMBANKMENT

Sheet 2 of 8

| VISUAL EXAMINATION OF | OBSERVATIONS | REMARKS OR RECOMMENDATIONS |
|--|---|---|
| SURFACE CRACKS | Several cracks were apparent in the embankment as a result of the breach in the dam. | The embankment must be repaired. |
| UNUSUAL MOVEMENT OR CRACKING AT OR BEYOND THE TOE | None observed | |
| SLOUGHING OR EROSION OF EMBANKMENT AND ABUTMENT SLOPES | The upstream slope to the left of the spillway has been severely eroded and appears to be unstable. | The upstream slope should be reconstructed and provided with riprap to protect against erosion. |
| VERTICAL AND HORIZONTAL ALIGNMENT OF THE CREST | There were no points surveyed along the crest of the dam that were below design elevation. | |
| RIPRAP FAILURES | There was no riprap observed. | |

EMBANKMENT

Sheet 3 of 8

| VISUAL EXAMINATION OF | OBSERVATIONS | REMARKS OR RECOMMENDATIONS |
|---|--|---|
| DRAINS | The reservoir may be drawn down from normal pool by means of the stop log gates adjacent to the spillway. The gates had been removed following the breach and were not in place during the inspection. | |
| JUNCTION OF EMBANKMENT AND ABUTMENT, SPILLWAY AND DAM | No problems observed. | |
| ANY NOTICEABLE SEEPAGE | None observed. However, the breach appeared to be a result of piping through the embankment. | A method of controlling seepage should be provided. |
| STAFF GAGE AND RECORDER | None. | |

UNGATED SPILLWAY

Sheet 4 of 8

| VISUAL EXAMINATION OF | OBSERVATIONS | REMARKS OR RECOMMENDATIONS |
|-----------------------|--------------|----------------------------|
|-----------------------|--------------|----------------------------|

| | | |
|---------------|--|--|
| CONCRETE WEIR | | |
|---------------|--|--|

| | | |
|--|--|--|
| | The weir appeared to be in good condition. | |
|--|--|--|

| | | |
|------------------|--|--|
| APPROACH CHANNEL | | |
|------------------|--|--|

| | | |
|--|------|--|
| | None | |
|--|------|--|

| | | |
|-------------------|--|--|
| DISCHARGE CHANNEL | | |
|-------------------|--|--|

| | | |
|--|---|--|
| | Spillway discharge flows through a box culvert beneath the highway, then into the Indian River. The culvert appeared to be in good condition. | |
|--|---|--|

| | | |
|------------------|--|--|
| BRIDGE AND PIERS | | |
|------------------|--|--|

| | | |
|--|------|--|
| | None | |
|--|------|--|

GATED SPILLWAY

Sheet 5 of 8

| VISUAL EXAMINATION OF | OBSERVATIONS | REMARKS OR RECOMMENDATIONS |
|-------------------------------|--|----------------------------|
| CONCRETE SILL | Water was flowing over the concrete sill during the inspection since the stoplog gates had been removed. No problems were observed. | |
| APPROACH CHANNEL | None | |
| DISCHARGE CHANNEL | Same as for ungated spillway. | |
| BRIDGE AND PIERS | None | |
| GATES AND OPERATION EQUIPMENT | The stoplog gates and operating hand wheels were removed from the structure following the breaching of the embankment in February of 1979. | |

INSTRUMENTATION

Sheet 6 of 8

| VISUAL EXAMINATION | OBSERVATIONS | REMARKS OR RECOMMENDATIONS |
|--------------------|--------------|----------------------------|
|--------------------|--------------|----------------------------|

MONUMENTATION/SURVEYS

The survey of the crest of the dam
revealed no settlement problems

OBSERVATION WELLS

None

WEIRS

None

PIEZOMETERS

None

OTHER

None

RESERVOIR

Sheet 7 of 8

| VISUAL EXAMINATION OF | OBSERVATIONS | REMARKS OR RECOMMENDATIONS |
|-----------------------|--------------|----------------------------|
|-----------------------|--------------|----------------------------|

SLOPES

There was no evidence of instability of the reservoir slopes.

SEDIMENTATION

There was no indication of excessive sedimentation in the reservoir.

DOWNSTREAM CHANNEL

Sheet 8 of 8

| VISUAL EXAMINATION OF | OBSERVATIONS | REMARKS OR RECOMMENDATIONS |
|---|---|----------------------------|
| CONDITION (OBSTRUCTIONS, DEBRIS, ETC.) | The downstream channel is the Indian River which is quite wide. It is unlikely that the river could ever become obstructed. | |
| SLOPES | The Indian River outlets into the Indian River Bay which joins the Atlantic Ocean and its banks are relatively flat. | |
| APPROXIMATE NO. OF HOMES AND POPULATION | There are three homes and approximately 15 people within the potential flood zone that would result from a failure of the embankment. | |

APPENDIX

C

Hydrologic & Hydraulic Data

TABLE OF CONTENTS - APPENDIX C

HYDRAULICS & HYDROLOGY

| | |
|--|-------------|
| PMP CALCULATIONS | SHEET 1 |
| SNYDER COEFFICIENTS | SHEET 1 |
| RESERVOIR SURFACE AREAS | SHEET 2 |
| SPILLWAY DISCHARGE CALCULATIONS | SHEETS 2-4 |
| HEC-1 DAM SAFETY VERSION COMPUTER OUTPUT | SHEETS 5-29 |



O'BRIEN & GERE

SUBJECT

MILLSBORO POND DAM

SHEET

1

BY

RRB

DATE

JOB NO

HYDROLOGY CALCULATIONS

DRAINAGE AREA (PLANIMETERED FROM USGS QUAD SHEETS): 61.5 SQ. MI.

PMP CALCULATIONS (HMR 33)

AREA IS IN ZONE 6

24 HR., 200 SQ. MI. RAINFALL = 2.5 INCHES

| <u>HR.</u> | <u>%</u> | <u>RAINFALL</u> | <u>Δ RF</u> |
|------------|----------|-----------------|-------------|
| 6 | 95 | 23.8 " | 23.8 " |
| 12 | 104 | 26.0 " | 2.2 " |
| 24 | 114 | 28.5 " | 2.5 " |
| 48 | 126 | 31.5 " | 3.0 " |

SNYDER COEFFICIENTS

INFORMATION PROVIDED BY PHILA. COE:

$$C_t = 3.0, \boxed{C_p = 0.5}$$

$$t_p = C_t (L \cdot L_{ca})^{0.3}$$

FROM QUAD SHEET:

$$L = 9.85 \text{ MILES}, L_{ca} = 4.92 \text{ MILES}$$

$$t_p = 3.0 (9.85 \cdot 4.92)^{0.3} = \boxed{9.6 \text{ HOURS}}$$



O'BRIEN & GERE

SUBJECT

MILLSBORO POND DAM

SHEET

2

BY

RRB

DATE

JOB NO

RESERVOIR SURFACE AREAS (PLANIMETERED FROM USGS SHEETS)

| <u>ELEV.</u> | <u>SURF. AREA (ACRES)</u> |
|--------------------------------|---------------------------|
| 6 (USGS NORMAL POOL - 1954) | 119.4 |
| 10 | 336.1 |
| 20 | 642.8 |
| 4.75 (NORMAL POOL - POST 1964) | 104.5 |

HYDRAULICS

THE SPILLWAY IS A TRIANGULAR SECTION WITH A VERTICAL UPSTREAM FACE AND A 2H:1V DOWNSTREAM FACE.

$$Q_s = CLH^{3/2}$$

FROM KING & BRATER'S HANDBOOK OF HYDRAULICS, PAGE 5-48, TABLE 5-7:

$$C = 3.54$$

THE CREST LENGTH IS SEMI-CIRCULAR IN SHAPE WITH A RADIUS OF 26 FEET.

THEREFORE,
$$L = \frac{2\pi R}{2} = 81.7 \text{ FEET}$$

$$Q_s = 289.2 H_s^{3/2}$$

ADDITIONAL FLOW WILL TAKE PLACE OVER THE STOP LOGS AT EITHER END OF THE SPILLWAY CREST (10')

$C_{sl} = 3.1$ \therefore THE EFFECTIVE LENGTH OVER THE STOP LOGS IS $3.1/3.54 \times 10' \approx 8.5'$ & $L_{TOTAL} \approx 90'$



O'BRIEN & GERE

SUBJECT

MILLSBORO POND DAM

SHEET

3

BY

DEC

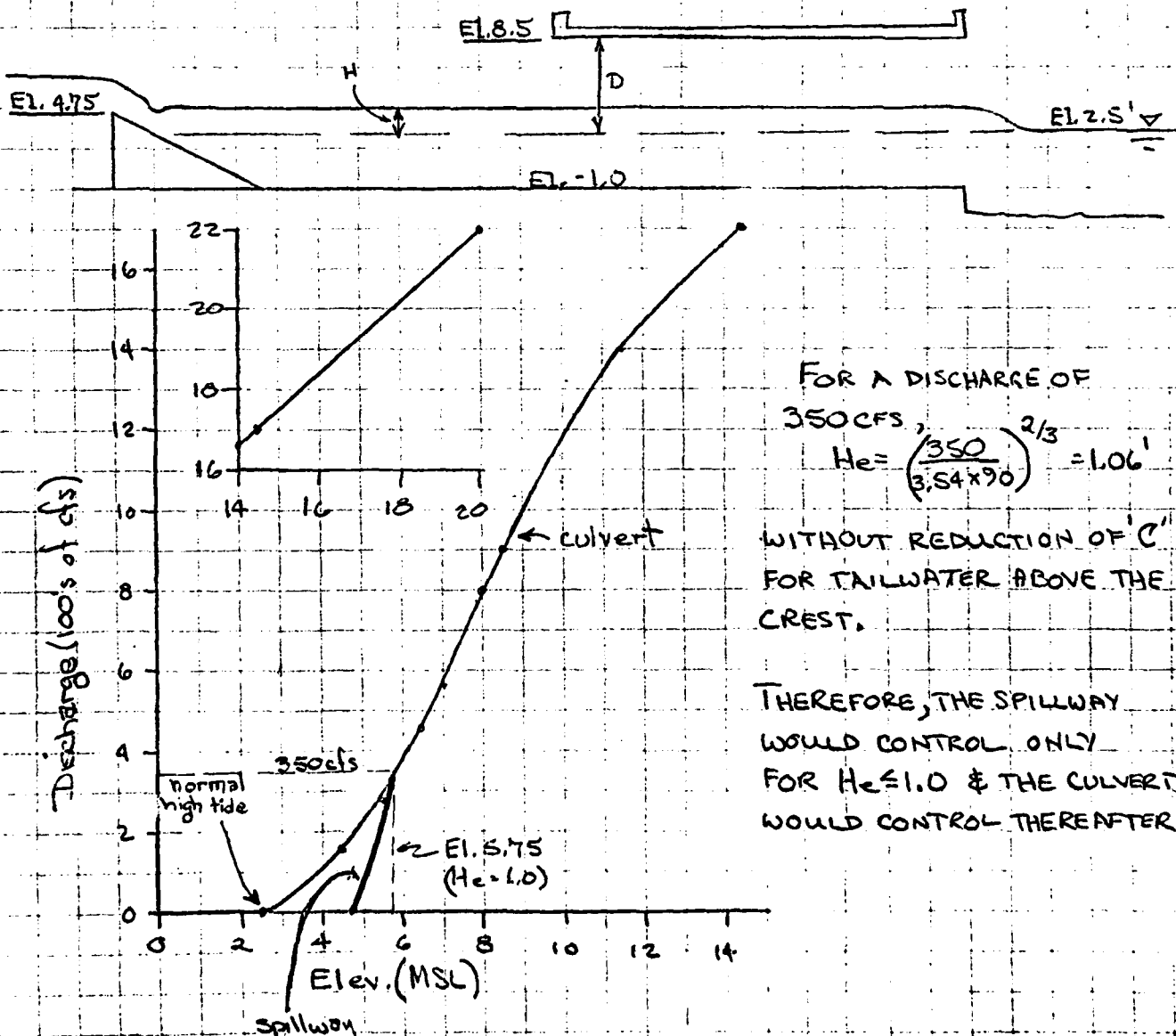
DATE

JOB NO

CULVERT DISCHARGE RATING

THE CULVERT DISCHARGE RATING WAS DEVELOPED FROM FIG. 17-29 OF OPEN CHANNEL HYDRAULICS, V.T. CHOW, P. 498.

THE CULVERT WAS ANALYZED ASSUMING A NORMAL HIGH TIDE ELEVATION OF 2.5' (FROM FIGURE 3 OF THIS TEXT). THE EFFECTIVE CULVERT OPENING WAS ASSUMED AS THE AREA ABOVE THE HIGH TIDE ELEVATION.



FOR A DISCHARGE OF 350 CFS,

$$H_e = \left(\frac{350}{3.54 \times 90} \right)^{2/3} = 1.06'$$

WITHOUT REDUCTION OF 'C' FOR TAILWATER ABOVE THE CREST.

THEREFORE, THE SPILLWAY WOULD CONTROL ONLY FOR $H_e \leq 1.0$ & THE CULVERT WOULD CONTROL THEREAFTER.



O'BRIEN & GERE

| | | | | | | | |
|---------|--------------------|-------|---|----|---------|------|--------|
| SUBJECT | MILLSBORO POND DAM | SHEET | 4 | BY | DBC/RRB | DATE | JOB NO |
|---------|--------------------|-------|---|----|---------|------|--------|

STAGE - DISCHARGE

| STAGE (FT. - MSL) | DISCHARGE (CFS) |
|-------------------|-----------------|
| 4.75 | 0 |
| 5.75 | 350 |
| 6.50 | 460 |
| 7.00 | 570 |
| 8.00 | 800 |
| 9.00 | 1000 |
| 10.00 | 1190 |
| 11.00 | 1340 |
| 12.00 | 1470 |
| 13.00 | 1550 |
| 14.00 | 1660 |
| 20.00 | 2200 |

DRAWDOWN TIME

DRAWDOWN FROM NORMAL POOL WOULD BE THROUGH THE TWO STOPPING GATES.
 MAXIMUM DRAWDOWN = 4.0 FT. FROM THE SPILLWAY CREST (TO ELEV. 0.75).

DISCHARGE $Q = CLH^{3/2}$ (ASSUME WEIR FLOW) $C = 3.0$ $L = 10$ FT. (TWO GATES)
 H VARIES FROM 4 FT. TO 0 FT.

STORAGE IS DETERMINED FOR EACH ELEVATION BY THE CONIC METHOD,

$$V = \frac{H}{3} (\sqrt{A_1 A_2} + A_1 + A_2)$$

USING AN APPROXIMATE RESERVOIR AREA OF 1 ACRE AT ELEVATION - 2.

POOL AREA AT EACH ELEVATION WAS ESTIMATED BY INTERPOLATING BETWEEN
 THE NORMAL POOL AREA OF 105 ACRES AND THE AREA AT ELEV. - 2.

DRAWDOWN TIME WAS ESTIMATED FOR EACH FOOT OF DRAWDOWN, BY DIVIDING
 THE STORAGE DIFFERENTIAL BY THE AVERAGE DISCHARGE RATE FOR EACH
 PERIOD

**O'BRIEN & GERE**

| SUBJECT | SHEET | BY | DATE | JOB NO. |
|--------------------|-------|-----|------|---------|
| MILLSBORD POND DAM | 4A | RRE | | |

| ELEV. | H (FT.) | Q (CFS) | Q _{AVG.} | STORAGE (A-F) | Δ STORAGE | TIME (HRS.) |
|-------|---------|---------|-------------------|---------------|-----------|-------------|
| 4.75 | 4 | 240 | | 260 | | |
| | | | 198 | | 98 | 6.0 |
| 3.75 | 3 | 156 | | 162 | | |
| | | | 121 | | 68 | 6.8 |
| 2.75 | 2 | 85 | | 94 | | |
| | | | 58 | | 46 | 9.6 |
| 1.75 | 1 | 30 | | 48 | | |
| | | | 15 | | 28 | 22.6 |
| 0.75 | 0 | 0 | | 20 | | |

Σ TIME = 45 HRS.

THE DRAWDOWN TIME FROM THE SPILLWAY CREST TO THE BASE OF THE STOPLOG GATES (ELEV. 0.75) IS ABOUT 45 HOURS, OR 2 DAYS.

HOWEVER, NORMAL HIGH TIDE ELEVATION IS ELEV. 2.5 SO THAT A DRAWDOWN TO ELEV. 0.75 WOULD ONLY LAST FOR A FEW HOURS BEFORE THE TIDAL FLOW REFILLED THE RESERVOIR (TO ELEV. 2.5).

 FLOOD HYDROGRAPH PACKAGE (HFC-1)
 DAY SAFETY VERSION JULY 1974
 LAST MODIFICATION 26 FEB 79

QW, DATE 09/24/79.
 TIME 0 13.14.00.

NATIONAL DAM INSPECTION PROGRAM
 WILLKROD POND DAM
 PMF HYDROLOGY

| NO | MR | N4IN | IDAY | IMP | IMIN | METC | IPLT | IPRT | NSTAN |
|-----|----|------|-------|-----|-------|-------|------|------|-------|
| 300 | 0 | 30 | 0 | 0 | 0 | 0 | 0 | 3 | 0 |
| | | | JUPFR | NWT | LROPT | TRACE | | | |
| | | | 5 | 0 | 0 | 0 | | | |

MULTI-PLAN ANALYSIS TO BE PERFORMED

PLAN= 1 NPLAN= 1 NPLAN= 9 LRTIO= 1
 RTIOS= .05 .10 .15 .20 .25 .30 .40 .50 1.00

SUB-AREA RUNOFF COMPUTATION

RUNOFF TO WILLKROD POND

| ISTAN | ICUM | IECON | ITAPE | JPLT | JUPRT | INAME | ISTAGE | LAUTO |
|-------|------|-------|-------|------|-------|-------|--------|-------|
| 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |

HYDROGRAPH DATA

| INVOG | INMG | TAREA | SNAP | TSDA | TRSPC | RATIO | TSNOV | TSAME | LOCAL |
|-------|------|-------|------|-------|-------|-------|-------|-------|-------|
| 1 | 1 | 61.50 | 0.00 | 61.50 | 0.00 | 0.000 | 0 | 1 | 0 |

PRECIP DATA

| SPFF | P4S | Q6 | R12 | R24 | R48 | R72 | R96 |
|------|-------|-------|--------|--------|--------|------|------|
| 0.00 | 25.00 | 95.00 | 104.00 | 114.00 | 126.00 | 0.00 | 0.00 |

TRSPC COMPUTED BY THE PROGRAM IS .455

LOSS DATA

| LAHMT | STORM | DLTRN | RTIOL | FRAIN | STPRS | RTIOK | STRTL | CNSTL | ALSHK | RTIMP |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 0 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 1.00 | 1.50 | .15 | 0.00 | 0.00 |

UNIT HYDROGRAPH DATA

TP= 9.00 CP= .50 NTA= 0

RECESSION DATA

SITUS= -1.50 ORCSN= -.05 RTIOS= 2.00

APPROXIMATE CLARK COEFFICIENTS FROM GIVEN SIVICH CP AND TP ARE TC=19.97 AND R=26.00 INTERVALS

| UNIT HYDROGRAPH 100 FWD-OF-PERIOD ORIGINATES | LAG= | 9.61 HOURS | CP= | .50 | VOL= | .97 |
|--|-------|------------|-------|-------|-------|-------|
| 24. | 90. | 186. | 302. | 432. | 575. | 727. |
| 1402. | 1547. | 1704. | 1827. | 1942. | 2017. | 2083. |
| 2072. | 1993. | 1914. | 1846. | 1776. | 1700. | 1643. |
| 1410. | 1357. | 1306. | 1244. | 1209. | 1163. | 1119. |
| | | | | | | 1077. |
| | | | | | | 1017. |
| | | | | | | 997. |
| | | | | | | 1229. |
| | | | | | | 1056. |
| | | | | | | 2126. |
| | | | | | | 2145. |
| | | | | | | 1465. |
| | | | | | | 1465. |
| | | | | | | 997. |

| MO, DA | MP, MN | PERIOD | RAIN | FXCS | LOSS | COMP Q | FWI-OF-PEWING FLOW | MP, MN | PERIOD | RAIN | FXCS | LOSS | COMP Q |
|--------|--------|--------|------|------|------|--------|--------------------|--------|--------|------|------|------|--------|
| 1.01 | 3.30 | 1 | .01 | 0.00 | .01 | 86. | 1.04 | 3.30 | 151 | 0.00 | 0.00 | 0.00 | 5811. |
| 1.01 | 1.00 | 2 | .01 | 0.00 | .01 | 80. | 1.04 | 4.00 | 152 | 0.00 | 0.00 | 0.00 | 5592. |
| 1.01 | 1.30 | 3 | .01 | 0.00 | .01 | 75. | 1.04 | 4.30 | 153 | 0.00 | 0.00 | 0.00 | 5181. |
| 1.01 | 2.00 | 4 | .01 | 0.00 | .01 | 70. | 1.04 | 5.00 | 154 | 0.00 | 0.00 | 0.00 | 5178. |
| 1.01 | 2.30 | 5 | .01 | 0.00 | .01 | 65. | 1.04 | 5.30 | 155 | 0.00 | 0.00 | 0.00 | 4943. |
| 1.01 | 3.00 | 6 | .01 | 0.00 | .01 | 61. | 1.04 | 6.00 | 156 | 0.00 | 0.00 | 0.00 | 4795. |
| 1.01 | 3.30 | 7 | .01 | 0.00 | .01 | 57. | 1.04 | 6.30 | 157 | 0.00 | 0.00 | 0.00 | 4614. |
| 1.01 | 4.00 | 8 | .01 | 0.00 | .01 | 53. | 1.04 | 7.00 | 158 | 0.00 | 0.00 | 0.00 | 4440. |
| 1.01 | 4.30 | 9 | .01 | 0.00 | .01 | 49. | 1.04 | 7.30 | 159 | 0.00 | 0.00 | 0.00 | 4272. |
| 1.01 | 5.00 | 10 | .01 | 0.00 | .01 | 46. | 1.04 | 8.00 | 160 | 0.00 | 0.00 | 0.00 | 4111. |
| 1.01 | 5.30 | 11 | .01 | 0.00 | .01 | 43. | 1.04 | 8.30 | 161 | 0.00 | 0.00 | 0.00 | 3948. |
| 1.01 | 6.00 | 12 | .01 | 0.00 | .01 | 40. | 1.04 | 9.00 | 162 | 0.00 | 0.00 | 0.00 | 3791. |
| 1.01 | 6.30 | 13 | .02 | 0.00 | .02 | 37. | 1.04 | 9.30 | 163 | 0.00 | 0.00 | 0.00 | 3639. |
| 1.01 | 7.00 | 14 | .02 | 0.00 | .02 | 35. | 1.04 | 10.00 | 164 | 0.00 | 0.00 | 0.00 | 3494. |
| 1.01 | 7.30 | 15 | .02 | 0.00 | .02 | 33. | 1.04 | 10.30 | 165 | 0.00 | 0.00 | 0.00 | 3354. |
| 1.01 | 8.00 | 16 | .02 | 0.00 | .02 | 30. | 1.04 | 11.00 | 166 | 0.00 | 0.00 | 0.00 | 3219. |
| 1.01 | 8.30 | 17 | .02 | 0.00 | .02 | 28. | 1.04 | 11.30 | 167 | 0.00 | 0.00 | 0.00 | 3090. |
| 1.01 | 9.00 | 18 | .02 | 0.00 | .02 | 26. | 1.04 | 12.00 | 168 | 0.00 | 0.00 | 0.00 | 2965. |
| 1.01 | 9.30 | 19 | .02 | 0.00 | .02 | 25. | 1.04 | 12.30 | 169 | 0.00 | 0.00 | 0.00 | 2845. |
| 1.01 | 10.00 | 20 | .02 | 0.00 | .02 | 23. | 1.04 | 13.00 | 170 | 0.00 | 0.00 | 0.00 | 2729. |
| 1.01 | 10.30 | 21 | .02 | 0.00 | .02 | 22. | 1.04 | 13.30 | 171 | 0.00 | 0.00 | 0.00 | 2618. |
| 1.01 | 11.00 | 22 | .02 | 0.00 | .02 | 20. | 1.04 | 14.00 | 172 | 0.00 | 0.00 | 0.00 | 2511. |
| 1.01 | 11.30 | 23 | .02 | 0.00 | .02 | 19. | 1.04 | 14.30 | 173 | 0.00 | 0.00 | 0.00 | 2377. |
| 1.01 | 12.00 | 24 | .02 | 0.00 | .02 | 17. | 1.04 | 15.00 | 174 | 0.00 | 0.00 | 0.00 | 2149. |
| 1.01 | 12.30 | 25 | .11 | 0.00 | .11 | 16. | 1.04 | 15.30 | 175 | 0.00 | 0.00 | 0.00 | 1990. |
| 1.01 | 13.00 | 26 | .11 | 0.00 | .11 | 15. | 1.04 | 16.00 | 176 | 0.00 | 0.00 | 0.00 | 1857. |
| 1.01 | 13.30 | 27 | .13 | 0.00 | .13 | 14. | 1.04 | 16.30 | 177 | 0.00 | 0.00 | 0.00 | 1733. |
| 1.01 | 14.00 | 28 | .13 | 0.00 | .13 | 13. | 1.04 | 17.00 | 178 | 0.00 | 0.00 | 0.00 | 1615. |
| 1.01 | 14.30 | 29 | .16 | 0.00 | .16 | 12. | 1.04 | 17.30 | 179 | 0.00 | 0.00 | 0.00 | 1508. |
| 1.01 | 15.00 | 30 | .16 | 0.00 | .16 | 12. | 1.04 | 18.00 | 180 | 0.00 | 0.00 | 0.00 | 1407. |
| 1.01 | 15.30 | 31 | .19 | 0.00 | .19 | 11. | 1.04 | 18.30 | 181 | 0.00 | 0.00 | 0.00 | 1313. |
| 1.01 | 16.00 | 32 | .62 | .35 | .27 | 14. | 1.04 | 19.00 | 182 | 0.00 | 0.00 | 0.00 | 1225. |
| 1.01 | 16.30 | 33 | .15 | .07 | .08 | 42. | 1.04 | 19.30 | 183 | 0.00 | 0.00 | 0.00 | 1143. |
| 1.01 | 17.00 | 34 | .15 | .07 | .08 | 42. | 1.04 | 20.00 | 184 | 0.00 | 0.00 | 0.00 | 1046. |
| 1.01 | 17.30 | 35 | .12 | .04 | .04 | 135. | 1.04 | 20.30 | 185 | 0.00 | 0.00 | 0.00 | 995. |
| 1.01 | 18.00 | 36 | .12 | .04 | .04 | 109. | 1.04 | 21.00 | 186 | 0.00 | 0.00 | 0.00 | 928. |
| 1.01 | 18.30 | 37 | .01 | 0.00 | .01 | 273. | 1.04 | 21.30 | 187 | 0.00 | 0.00 | 0.00 | 856. |
| 1.01 | 19.00 | 38 | .01 | 0.00 | .01 | 355. | 1.04 | 22.00 | 188 | 0.00 | 0.00 | 0.00 | 808. |
| 1.01 | 19.30 | 39 | .01 | 0.00 | .01 | 453. | 1.04 | 22.30 | 189 | 0.00 | 0.00 | 0.00 | 754. |
| 1.01 | 20.00 | 40 | .01 | 0.00 | .01 | 536. | 1.04 | 23.00 | 190 | 0.00 | 0.00 | 0.00 | 704. |
| 1.01 | 20.30 | 41 | .01 | 0.00 | .01 | 433. | 1.04 | 23.30 | 191 | 0.00 | 0.00 | 0.00 | 654. |
| 1.01 | 21.00 | 42 | .01 | 0.00 | .01 | 732. | 1.05 | 0.00 | 192 | 0.00 | 0.00 | 0.00 | 613. |
| 1.01 | 21.30 | 43 | .01 | 0.00 | .01 | 821. | 1.05 | .30 | 193 | 0.00 | 0.00 | 0.00 | 572. |
| 1.01 | 22.00 | 44 | .01 | 0.00 | .01 | 915. | 1.05 | 1.00 | 194 | 0.00 | 0.00 | 0.00 | 533. |
| 1.01 | 22.30 | 45 | .01 | 0.00 | .01 | 995. | 1.05 | 1.30 | 195 | 0.00 | 0.00 | 0.00 | 498. |
| 1.01 | 23.00 | 46 | .01 | 0.00 | .01 | 1065. | 1.05 | 2.00 | 196 | 0.00 | 0.00 | 0.00 | 464. |
| 1.01 | 23.30 | 47 | .01 | 0.00 | .01 | 1124. | 1.05 | 2.30 | 197 | 0.00 | 0.00 | 0.00 | 433. |
| 1.02 | 0.00 | 48 | .01 | 0.00 | .01 | 1172. | 1.05 | 3.00 | 198 | 0.00 | 0.00 | 0.00 | 404. |
| 1.02 | .30 | 49 | .07 | 0.00 | .07 | 1204. | 1.05 | 3.30 | 199 | 0.00 | 0.00 | 0.00 | 377. |
| 1.02 | 1.00 | 50 | .07 | 0.00 | .07 | 1231. | 1.05 | 4.00 | 200 | 0.00 | 0.00 | 0.00 | 352. |
| 1.02 | 1.30 | 51 | .07 | 0.00 | .07 | 1236. | 1.05 | 4.30 | 201 | 0.00 | 0.00 | 0.00 | 328. |
| 1.02 | 2.00 | 52 | .07 | 0.00 | .07 | 1271. | 1.05 | 5.00 | 202 | 0.00 | 0.00 | 0.00 | 306. |

| | | | | | | | | | | | | | | |
|------|-------|-----|-----|------|-----|--------|------|-------|-----|------|------|------|------|------|
| 1.02 | 2.30 | 57 | -07 | 0.00 | -07 | 1100. | 1.05 | 5.30 | 203 | 0.00 | 0.00 | 0.00 | 0.00 | 286. |
| 1.02 | 3.00 | 54 | -07 | 0.00 | -07 | 1154. | 1.05 | 6.00 | 204 | 0.00 | 0.00 | 0.00 | 0.00 | 261. |
| 1.02 | 3.30 | 55 | -07 | 0.00 | -07 | 1114. | 1.05 | 6.30 | 205 | 0.00 | 0.00 | 0.00 | 0.00 | 249. |
| 1.02 | 4.00 | 56 | -07 | 0.00 | -07 | 1073. | 1.05 | 7.00 | 206 | 0.00 | 0.00 | 0.00 | 0.00 | 232. |
| 1.02 | 4.30 | 57 | -07 | 0.00 | -07 | 1033. | 1.05 | 7.30 | 207 | 0.00 | 0.00 | 0.00 | 0.00 | 217. |
| 1.02 | 5.00 | 58 | -07 | 0.00 | -07 | 994. | 1.05 | 8.00 | 208 | 0.00 | 0.00 | 0.00 | 0.00 | 202. |
| 1.02 | 5.30 | 59 | -07 | 0.00 | -07 | 956. | 1.05 | 8.30 | 209 | 0.00 | 0.00 | 0.00 | 0.00 | 199. |
| 1.02 | 6.00 | 60 | -07 | 0.00 | -07 | 920. | 1.05 | 9.00 | 210 | 0.00 | 0.00 | 0.00 | 0.00 | 176. |
| 1.02 | 6.30 | 61 | -16 | -09 | -08 | 887. | 1.05 | 9.30 | 211 | 0.00 | 0.00 | 0.00 | 0.00 | 164. |
| 1.02 | 7.00 | 62 | -16 | -09 | -08 | 861. | 1.05 | 10.00 | 212 | 0.00 | 0.00 | 0.00 | 0.00 | 153. |
| 1.02 | 7.30 | 63 | -16 | -09 | -08 | 845. | 1.05 | 10.30 | 213 | 0.00 | 0.00 | 0.00 | 0.00 | 143. |
| 1.02 | 8.00 | 64 | -16 | -09 | -08 | 840. | 1.05 | 11.00 | 214 | 0.00 | 0.00 | 0.00 | 0.00 | 133. |
| 1.02 | 8.30 | 65 | -16 | -09 | -08 | 847. | 1.05 | 11.30 | 215 | 0.00 | 0.00 | 0.00 | 0.00 | 124. |
| 1.02 | 9.00 | 66 | -16 | -09 | -08 | 857. | 1.05 | 12.00 | 216 | 0.00 | 0.00 | 0.00 | 0.00 | 116. |
| 1.02 | 9.30 | 67 | -16 | -09 | -08 | 902. | 1.05 | 12.30 | 217 | 0.00 | 0.00 | 0.00 | 0.00 | 108. |
| 1.02 | 10.00 | 68 | -16 | -09 | -08 | 951. | 1.05 | 13.00 | 218 | 0.00 | 0.00 | 0.00 | 0.00 | 101. |
| 1.02 | 10.30 | 69 | -16 | -09 | -08 | 1016. | 1.05 | 13.30 | 219 | 0.00 | 0.00 | 0.00 | 0.00 | 94. |
| 1.02 | 11.00 | 70 | -16 | -09 | -08 | 1096. | 1.05 | 14.00 | 220 | 0.00 | 0.00 | 0.00 | 0.00 | 88. |
| 1.02 | 11.30 | 71 | -16 | -09 | -08 | 1142. | 1.05 | 14.30 | 221 | 0.00 | 0.00 | 0.00 | 0.00 | 82. |
| 1.02 | 12.00 | 72 | -16 | -09 | -08 | 1302. | 1.05 | 15.00 | 222 | 0.00 | 0.00 | 0.00 | 0.00 | 77. |
| 1.02 | 12.30 | 73 | -16 | -09 | -08 | 1444. | 1.05 | 15.30 | 223 | 0.00 | 0.00 | 0.00 | 0.00 | 71. |
| 1.02 | 13.00 | 74 | -16 | -09 | -08 | 1658. | 1.05 | 16.00 | 224 | 0.00 | 0.00 | 0.00 | 0.00 | 67. |
| 1.02 | 13.30 | 75 | -16 | -09 | -08 | 1846. | 1.05 | 16.30 | 225 | 0.00 | 0.00 | 0.00 | 0.00 | 62. |
| 1.02 | 14.00 | 76 | -16 | -09 | -08 | 2305. | 1.05 | 17.00 | 226 | 0.00 | 0.00 | 0.00 | 0.00 | 58. |
| 1.02 | 14.30 | 77 | -16 | -09 | -08 | 2809. | 1.05 | 17.30 | 227 | 0.00 | 0.00 | 0.00 | 0.00 | 54. |
| 1.02 | 15.00 | 78 | -16 | -09 | -08 | 3712. | 1.05 | 18.00 | 228 | 0.00 | 0.00 | 0.00 | 0.00 | 51. |
| 1.02 | 15.30 | 79 | -16 | -09 | -08 | 4452. | 1.05 | 18.30 | 229 | 0.00 | 0.00 | 0.00 | 0.00 | 47. |
| 1.02 | 16.00 | 80 | -16 | -09 | -08 | 5309. | 1.05 | 19.00 | 230 | 0.00 | 0.00 | 0.00 | 0.00 | 44. |
| 1.02 | 16.30 | 81 | -16 | -09 | -08 | 7449. | 1.05 | 19.30 | 231 | 0.00 | 0.00 | 0.00 | 0.00 | 41. |
| 1.02 | 17.00 | 82 | -16 | -09 | -08 | 9576. | 1.05 | 20.00 | 232 | 0.00 | 0.00 | 0.00 | 0.00 | 38. |
| 1.02 | 17.30 | 83 | -16 | -09 | -08 | 11878. | 1.05 | 20.30 | 233 | 0.00 | 0.00 | 0.00 | 0.00 | 36. |
| 1.02 | 18.00 | 84 | -16 | -09 | -08 | 14433. | 1.05 | 21.00 | 234 | 0.00 | 0.00 | 0.00 | 0.00 | 31. |
| 1.02 | 18.30 | 85 | -16 | -09 | -08 | 17174. | 1.05 | 21.30 | 235 | 0.00 | 0.00 | 0.00 | 0.00 | 31. |
| 1.02 | 19.00 | 86 | -16 | -09 | -08 | 20038. | 1.05 | 22.00 | 236 | 0.00 | 0.00 | 0.00 | 0.00 | 29. |
| 1.02 | 19.30 | 87 | -16 | -09 | -08 | 22950. | 1.05 | 22.30 | 237 | 0.00 | 0.00 | 0.00 | 0.00 | 27. |
| 1.02 | 20.00 | 88 | -16 | -09 | -08 | 25959. | 1.05 | 23.00 | 238 | 0.00 | 0.00 | 0.00 | 0.00 | 25. |
| 1.02 | 20.30 | 89 | -16 | -09 | -08 | 28714. | 1.05 | 23.30 | 239 | 0.00 | 0.00 | 0.00 | 0.00 | 24. |
| 1.02 | 21.00 | 90 | -16 | -09 | -08 | 31430. | 1.06 | 0.00 | 240 | 0.00 | 0.00 | 0.00 | 0.00 | 22. |
| 1.02 | 21.30 | 91 | -16 | -09 | -08 | 34347. | 1.06 | 1.00 | 241 | 0.00 | 0.00 | 0.00 | 0.00 | 21. |
| 1.02 | 22.00 | 92 | -16 | -09 | -08 | 36175. | 1.06 | 1.30 | 242 | 0.00 | 0.00 | 0.00 | 0.00 | 19. |
| 1.02 | 22.30 | 93 | -16 | -09 | -08 | 37982. | 1.06 | 1.60 | 243 | 0.00 | 0.00 | 0.00 | 0.00 | 18. |
| 1.02 | 23.00 | 94 | -16 | -09 | -08 | 39444. | 1.06 | 2.00 | 244 | 0.00 | 0.00 | 0.00 | 0.00 | 17. |
| 1.02 | 23.30 | 95 | -16 | -09 | -08 | 40513. | 1.06 | 2.30 | 245 | 0.00 | 0.00 | 0.00 | 0.00 | 16. |
| 1.03 | 0.00 | 96 | -16 | -09 | -08 | 41103. | 1.06 | 3.00 | 246 | 0.00 | 0.00 | 0.00 | 0.00 | 15. |
| 1.03 | 0.30 | 97 | -16 | -09 | -08 | 41492. | 1.06 | 3.30 | 247 | 0.00 | 0.00 | 0.00 | 0.00 | 14. |
| 1.03 | 1.00 | 98 | -16 | -09 | -08 | 41414. | 1.06 | 4.00 | 248 | 0.00 | 0.00 | 0.00 | 0.00 | 13. |
| 1.03 | 1.30 | 99 | -16 | -09 | -08 | 40952. | 1.06 | 4.30 | 249 | 0.00 | 0.00 | 0.00 | 0.00 | 12. |
| 1.03 | 2.00 | 100 | -16 | -09 | -08 | 40105. | 1.06 | 5.00 | 250 | 0.00 | 0.00 | 0.00 | 0.00 | 11. |
| 1.03 | 2.30 | 101 | -16 | -09 | -08 | 39011. | 1.06 | 5.30 | 251 | 0.00 | 0.00 | 0.00 | 0.00 | 10. |
| 1.03 | 3.00 | 102 | -16 | -09 | -08 | 37811. | 1.06 | 6.00 | 252 | 0.00 | 0.00 | 0.00 | 0.00 | 9. |
| 1.03 | 3.30 | 103 | -16 | -09 | -08 | 36463. | 1.06 | 6.30 | 253 | 0.00 | 0.00 | 0.00 | 0.00 | 8. |
| 1.03 | 4.00 | 104 | -16 | -09 | -08 | 35251. | 1.06 | 7.00 | 254 | 0.00 | 0.00 | 0.00 | 0.00 | 7. |
| 1.03 | 4.30 | 105 | -16 | -09 | -08 | 33979. | 1.06 | 7.30 | 255 | 0.00 | 0.00 | 0.00 | 0.00 | 6. |
| 1.03 | 5.00 | 106 | -16 | -09 | -08 | 32768. | 1.06 | 8.00 | 256 | 0.00 | 0.00 | 0.00 | 0.00 | 5. |
| 1.03 | 5.30 | 107 | -16 | -09 | -08 | 31547. | 1.06 | 8.30 | 257 | 0.00 | 0.00 | 0.00 | 0.00 | 4. |
| 1.03 | 6.00 | 108 | -16 | -09 | -08 | 30403. | 1.06 | 9.00 | 258 | 0.00 | 0.00 | 0.00 | 0.00 | 4. |
| 1.03 | 6.30 | 109 | -16 | -09 | -08 | 29287. | 1.06 | 9.30 | 259 | 0.00 | 0.00 | 0.00 | 0.00 | 4. |
| 1.03 | 7.00 | 110 | -16 | -09 | -08 | 28207. | 1.06 | 10.00 | 260 | 0.00 | 0.00 | 0.00 | 0.00 | 4. |
| 1.03 | 7.30 | 111 | -16 | -09 | -08 | 27162. | 1.06 | 10.30 | 261 | 0.00 | 0.00 | 0.00 | 0.00 | 4. |
| 1.03 | 8.00 | 112 | -16 | -09 | -08 | 26151. | 1.06 | 11.00 | 262 | 0.00 | 0.00 | 0.00 | 0.00 | 4. |
| 1.03 | 8.30 | 113 | -16 | -09 | -08 | 25174. | 1.06 | 11.30 | 263 | 0.00 | 0.00 | 0.00 | 0.00 | 4. |
| 1.03 | 9.00 | 114 | -16 | -09 | -08 | 24270. | 1.06 | 12.00 | 264 | 0.00 | 0.00 | 0.00 | 0.00 | 4. |

| | | | | | | | | | | | | | |
|------|-------|-----|------|------|------|--------|------|-------|-----|------|------|------|----|
| 1.03 | 9.30 | 114 | 0.00 | 0.00 | 0.00 | 23319. | 1.04 | 12.30 | 245 | 0.00 | 0.00 | 0.00 | 4. |
| 1.03 | 10.00 | 116 | 0.00 | 0.00 | 0.00 | 22440. | 1.04 | 13.00 | 266 | 0.00 | 0.00 | 0.00 | 4. |
| 1.03 | 10.30 | 117 | 0.00 | 0.00 | 0.00 | 21593. | 1.04 | 13.30 | 267 | 0.00 | 0.00 | 0.00 | 3. |
| 1.03 | 11.00 | 118 | 0.00 | 0.00 | 0.00 | 20774. | 1.06 | 14.00 | 268 | 0.00 | 0.00 | 0.00 | 3. |
| 1.03 | 11.30 | 119 | 0.00 | 0.00 | 0.00 | 19994. | 1.06 | 14.30 | 269 | 0.00 | 0.00 | 0.00 | 3. |
| 1.03 | 12.00 | 120 | 0.00 | 0.00 | 0.00 | 19240. | 1.06 | 15.00 | 270 | 0.00 | 0.00 | 0.00 | 3. |
| 1.03 | 12.30 | 121 | 0.00 | 0.00 | 0.00 | 18514. | 1.06 | 15.30 | 271 | 0.00 | 0.00 | 0.00 | 3. |
| 1.03 | 13.00 | 122 | 0.00 | 0.00 | 0.00 | 17815. | 1.06 | 16.00 | 272 | 0.00 | 0.00 | 0.00 | 2. |
| 1.03 | 13.30 | 123 | 0.00 | 0.00 | 0.00 | 17163. | 1.06 | 16.30 | 273 | 0.00 | 0.00 | 0.00 | 2. |
| 1.03 | 14.00 | 124 | 0.00 | 0.00 | 0.00 | 16496. | 1.06 | 17.00 | 274 | 0.00 | 0.00 | 0.00 | 2. |
| 1.03 | 14.30 | 125 | 0.00 | 0.00 | 0.00 | 15874. | 1.06 | 17.30 | 275 | 0.00 | 0.00 | 0.00 | 2. |
| 1.03 | 15.00 | 126 | 0.00 | 0.00 | 0.00 | 15275. | 1.06 | 18.00 | 276 | 0.00 | 0.00 | 0.00 | 2. |
| 1.03 | 15.30 | 127 | 0.00 | 0.00 | 0.00 | 14694. | 1.06 | 18.30 | 277 | 0.00 | 0.00 | 0.00 | 2. |
| 1.03 | 16.00 | 128 | 0.00 | 0.00 | 0.00 | 14144. | 1.06 | 19.00 | 278 | 0.00 | 0.00 | 0.00 | 2. |
| 1.03 | 16.30 | 129 | 0.00 | 0.00 | 0.00 | 13610. | 1.06 | 19.30 | 279 | 0.00 | 0.00 | 0.00 | 1. |
| 1.03 | 17.00 | 130 | 0.00 | 0.00 | 0.00 | 13096. | 1.06 | 20.00 | 280 | 0.00 | 0.00 | 0.00 | 1. |
| 1.03 | 17.30 | 131 | 0.00 | 0.00 | 0.00 | 12602. | 1.06 | 20.30 | 281 | 0.00 | 0.00 | 0.00 | 1. |
| 1.03 | 18.00 | 132 | 0.00 | 0.00 | 0.00 | 12093. | 1.06 | 21.00 | 282 | 0.00 | 0.00 | 0.00 | 1. |
| 1.03 | 18.30 | 133 | 0.00 | 0.00 | 0.00 | 11630. | 1.06 | 21.30 | 283 | 0.00 | 0.00 | 0.00 | 1. |
| 1.03 | 19.00 | 134 | 0.00 | 0.00 | 0.00 | 11184. | 1.06 | 22.00 | 284 | 0.00 | 0.00 | 0.00 | 1. |
| 1.03 | 19.30 | 135 | 0.00 | 0.00 | 0.00 | 10754. | 1.06 | 22.30 | 285 | 0.00 | 0.00 | 0.00 | 1. |
| 1.03 | 20.00 | 136 | 0.00 | 0.00 | 0.00 | 10344. | 1.06 | 23.00 | 286 | 0.00 | 0.00 | 0.00 | 1. |
| 1.03 | 20.30 | 137 | 0.00 | 0.00 | 0.00 | 9957. | 1.06 | 23.30 | 287 | 0.00 | 0.00 | 0.00 | 1. |
| 1.03 | 21.00 | 138 | 0.00 | 0.00 | 0.00 | 9582. | 1.07 | 0.00 | 288 | 0.00 | 0.00 | 0.00 | 1. |
| 1.03 | 21.30 | 139 | 0.00 | 0.00 | 0.00 | 9220. | 1.07 | 1.30 | 289 | 0.00 | 0.00 | 0.00 | 1. |
| 1.03 | 22.00 | 140 | 0.00 | 0.00 | 0.00 | 8872. | 1.07 | 1.30 | 290 | 0.00 | 0.00 | 0.00 | 1. |
| 1.03 | 22.30 | 141 | 0.00 | 0.00 | 0.00 | 8534. | 1.07 | 1.30 | 291 | 0.00 | 0.00 | 0.00 | 1. |
| 1.03 | 23.00 | 142 | 0.00 | 0.00 | 0.00 | 8214. | 1.07 | 2.00 | 292 | 0.00 | 0.00 | 0.00 | 1. |
| 1.03 | 23.30 | 143 | 0.00 | 0.00 | 0.00 | 7905. | 1.07 | 2.30 | 293 | 0.00 | 0.00 | 0.00 | 1. |
| 1.04 | 0.00 | 144 | 0.00 | 0.00 | 0.00 | 7607. | 1.07 | 3.00 | 294 | 0.00 | 0.00 | 0.00 | 1. |
| 1.04 | 0.30 | 145 | 0.00 | 0.00 | 0.00 | 7320. | 1.07 | 3.30 | 295 | 0.00 | 0.00 | 0.00 | 0. |
| 1.04 | 1.00 | 146 | 0.00 | 0.00 | 0.00 | 7044. | 1.07 | 4.00 | 296 | 0.00 | 0.00 | 0.00 | 0. |
| 1.04 | 1.30 | 147 | 0.00 | 0.00 | 0.00 | 6774. | 1.07 | 4.30 | 297 | 0.00 | 0.00 | 0.00 | 0. |
| 1.04 | 2.00 | 148 | 0.00 | 0.00 | 0.00 | 6522. | 1.07 | 5.00 | 298 | 0.00 | 0.00 | 0.00 | 0. |
| 1.04 | 2.30 | 149 | 0.00 | 0.00 | 0.00 | 6276. | 1.07 | 5.30 | 299 | 0.00 | 0.00 | 0.00 | 0. |
| 1.04 | 3.00 | 150 | 0.00 | 0.00 | 0.00 | 6039. | 1.07 | 6.00 | 300 | 0.00 | 0.00 | 0.00 | 0. |

SUM 26.93 21.39 5.54 164477.
(684.) (543.) (141.) (47130.)

| PEAK | A-MOIR | 24-MOIR | 72-MOIR | TOTAL VOLUME |
|--------|--------|---------|---------|--------------|
| 41492. | 30346. | 26824. | 11434. | 146487. |
| 1175. | 1314. | 740. | 324. | 47139. |
| | 5.95 | 16.23 | 20.74 | 20.94 |
| | 151.17 | 412.23 | 527.34 | 532.97 |
| | 19511. | 53205. | 64044. | 64749. |
| | 24066. | 55627. | 83940. | 84850. |

HYDROGRAPH AT STATION FOR PLAN 1. RTIO 1

| PEAK | A-MOIR | 24-MOIR | 72-MOIR | TOTAL VOLUME |
|-------|--------|---------|---------|--------------|
| 2074. | 1967. | 1341. | 572. | 43234. |
| 54. | 54. | 34. | 16. | 2957. |
| | 7.56 | 20.41 | 1.04 | 1.05 |
| | 976. | 2660. | 26.37 | 26.65 |
| | 1203. | 3281. | 4194. | 3439. |
| | | | | 4242. |

HYDROGRAPH AT STATIONFLOW FOR PLAN 1, RTIO 2

| | PEAK | 6-HOUR | 24-HOUR | 72-HOUR | TOTAL VOLUME |
|------------|-------|--------|---------|---------|--------------|
| CFS | 4149. | 3035. | 2882. | 1144. | 166469. |
| CMS | 111. | 111. | 76. | 32. | 4714. |
| INCHES | | .60 | 1.52 | 2.08 | 7.10 |
| MM | | 15.12 | 41.22 | 52.74 | 53.30 |
| AC-FT | | 1951. | 5320. | 6807. | 6879. |
| THOUS CU Y | | 2407. | 6563. | 8396. | 8485. |

HYDROGRAPH AT STATIONFLOW FOR PLAN 1, RTIO 3

| | PEAK | 6-HOUR | 24-HOUR | 72-HOUR | TOTAL VOLUME |
|------------|-------|--------|---------|---------|--------------|
| CFS | 6224. | 5902. | 4024. | 1716. | 249703. |
| CMS | 176. | 167. | 114. | 49. | 7071. |
| INCHES | | .80 | 2.43 | 3.11 | 3.15 |
| MM | | 22.67 | 61.83 | 79.11 | 79.95 |
| AC-FT | | 2927. | 7981. | 10210. | 10318. |
| THOUS CU Y | | 3610. | 9844. | 12584. | 12727. |

HYDROGRAPH AT STATIONFLOW FOR PLAN 1, RTIO 4

| | PEAK | 6-HOUR | 24-HOUR | 72-HOUR | TOTAL VOLUME |
|------------|-------|--------|---------|---------|--------------|
| CFS | 7208. | 7869. | 5365. | 2288. | 332937. |
| CMS | 235. | 223. | 152. | 65. | 9428. |
| INCHES | | 1.19 | 3.25 | 4.15 | 4.20 |
| MM | | 30.23 | 82.45 | 105.48 | 106.59 |
| AC-FT | | 3902. | 10641. | 13614. | 13758. |
| THOUS CU Y | | 4813. | 13125. | 16792. | 16970. |

HYDROGRAPH AT STATIONFLOW FOR PLAN 1, RTIO 5

| | PEAK | 6-HOUR | 24-HOUR | 72-HOUR | TOTAL VOLUME |
|------------|--------|--------|---------|---------|--------------|
| CFS | 10373. | 9837. | 6706. | 2860. | 416172. |
| CMS | 294. | 279. | 190. | 81. | 11745. |
| INCHES | | 1.49 | 4.06 | 5.19 | 5.25 |
| MM | | 37.79 | 103.06 | 131.85 | 133.24 |
| AC-FT | | 4874. | 13301. | 17017. | 17167. |
| THOUS CU Y | | 6016. | 14407. | 20998. | 21212. |

HYDROGRAPH AT STATIONFLOW FOR PLAN 1, RTIO 6

| | PEAK | 6-HOUR | 24-HOUR | 72-HOUR | TOTAL VOLUME |
|------------|--------|--------|---------|---------|--------------|
| CFS | 12449. | 11804. | 8047. | 3432. | 499406. |
| CMS | 352. | 334. | 224. | 97. | 14142. |
| INCHES | | 1.79 | 4.97 | 6.23 | 6.29 |
| MM | | 45.35 | 123.67 | 158.21 | 159.89 |
| AC-FT | | 5853. | 15981. | 20420. | 20837. |
| THOUS CU Y | | 7220. | 19688. | 25188. | 25455. |

HYDROGRAPH AT STATIONFLOW FOR PLAN 1, RTIO 7

| | | | | |
|------------|--------|---------|---------|--------------|
| PEAK | 6-HOUR | 24-HOUR | 72-HOUR | TOTAL VOLUME |
| 20746. | 19673. | 13412. | 5720. | 832344. |
| 587. | 557. | 380. | 162. | 23569. |
| CFS | 2.98 | 8.11 | 10.38 | 10.49 |
| CMS | 75.58 | 206.11 | 263.69 | 266.48 |
| INCHES | 9755. | 26602. | 34034. | 34394. |
| MM | 12033. | 32814. | 41980. | 42425. |
| AC-FT | | | | |
| THOUS CU M | | | | |

HYDROGRAPH AT STAINFLOW FOR PLAN 1, RTIO 8

| | | | | |
|------------|--------|---------|---------|--------------|
| PEAK | 6-HOUR | 24-HOUR | 72-HOUR | TOTAL VOLUME |
| 31119. | 29510. | 20118. | 8579. | 1248516. |
| 881. | 836. | 570. | 243. | 35354. |
| CFS | 4.46 | 12.17 | 15.57 | 15.74 |
| CMS | 113.37 | 309.17 | 395.54 | 399.73 |
| INCHES | 14633. | 39904. | 51051. | 51592. |
| MM | 18049. | 49220. | 62970. | 63637. |
| AC-FT | | | | |
| THOUS CU M | | | | |

HYDROGRAPH AT STAINFLOW FOR PLAN 1, RTIO 9

| | | | | |
|------------|--------|---------|---------|--------------|
| PEAK | 6-HOUR | 24-HOUR | 72-HOUR | TOTAL VOLUME |
| 41492. | 39346. | 28824. | 11439. | 1664687. |
| 1175. | 1114. | 760. | 324. | 47139. |
| CFS | 5.95 | 16.23 | 20.76 | 20.98 |
| CMS | 151.17 | 412.23 | 527.38 | 532.97 |
| INCHES | 19511. | 53205. | 68068. | 68789. |
| MM | 24066. | 65627. | 83460. | 84850. |
| AC-FT | | | | |
| THOUS CU M | | | | |

.....

.....

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.....

.....

HYDROGRAPH ROUTING

ROUTING THROUGH MILLSHORO POND

| | | | | | | | | |
|--------|-------|--------------|-------|-------|-------|-------|--------|-------|
| ISTAG | ICOMP | IECON | ITAPE | JPLI | JPHI | INAME | ISTAGE | IAUTO |
| OUTFLO | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| CLOSS | AVG | ROUTING DATA | | | | | LSTR | |
| 0.0 | 0.00 | 1 | 1 | 0 | 0 | | | |
| MSIPS | MSIDL | LAG | AMSKK | X | ISK | STORA | ISPHAT | |
| 1 | 0 | 0 | 0.000 | 0.000 | 0.000 | -5. | -1 | |

| | | | | | | | | | | |
|---------|---------|--------|--------|--------|--------|---------|---------|---------|---------|---------|
| STAGE | 4.75 | 5.75 | 6.50 | 7.00 | 8.00 | 9.00 | 10.00 | 11.00 | 12.00 | 13.00 |
| 14.00 | 20.00 | | | | | | | | | |
| FLOW | 0.00 | 350.00 | 460.00 | 570.00 | 800.00 | 1000.00 | 1190.00 | 1340.00 | 1470.00 | 1550.00 |
| 1660.00 | 2200.00 | | | | | | | | | |

| | | | |
|---------------|------|-------|-------|
| SURFACE AREA= | 105. | 336. | 643. |
| CAPACITY= | 0. | 1049. | 5911. |
| ELEVATION= | 5. | 10. | 20. |

SH 101

[illegible]

PEAK OUTFLOW IS 559. AT TIME 55.00 HOURS

| | PEAK | 6-HOUR | 24-HOUR | 72-HOUR | TOTAL VOLUME |
|------------|------|--------|---------|---------|--------------|
| CFS | 559. | 553. | 481. | 229. | 3344. |
| CMS | 16. | 14. | 14. | 6. | 944. |
| INCHES | | .08 | .29 | .41 | .42 |
| MM | | 2.12 | 7.39 | 10.54 | 10.68 |
| AC-FT | | 953. | 953. | 1360. | 1378. |
| THOUS CU M | | 338. | 1176. | 1677. | 1700. |

STATION OUTFLO, PLAN 1, RATIO 2
END-OF-PERIOD HYDROGRAPH ORIGINATES

5/14/15

[illegible]

PEAK OUTFLOW IS 98M. AT TIME 56.50 HOURS

| | PEAK | 6-HOUR | 24-HOUR | 72-HOUR | TOTAL |
|------------|------|--------|---------|---------|-------|
| CFS | 988. | 982. | 885. | 456. | 6629. |
| CMS | 28. | 28. | 25. | 13. | 1887. |
| INCHES | | | .54 | .83 | .84 |
| MM | | 3.77 | 13.59 | 21.04 | 21.33 |
| AC-FI | | 487. | 1755. | 2715. | 2753. |
| THOUS CU M | | 600. | 2164. | 3349. | 3396. |

STATION OUTFLO. PLAN 1. RATIO 3

END-OF-PERIOD HYDROGRAPH ORDINATES

PROJINO

| OUTFLOW | | INFLOW | | NET FLOW | |
|---------|------|--------|------|----------|------|
| 1. | 2. | 1. | 2. | 3. | 4. |
| 3. | 3. | 3. | 3. | 5. | 5. |
| 2. | 2. | 2. | 2. | 4. | 4. |
| 1. | 1. | 1. | 1. | 3. | 3. |
| 18. | 21. | 18. | 21. | 15. | 15. |
| 51. | 56. | 54. | 58. | 48. | 48. |
| 59. | 57. | 59. | 57. | 60. | 60. |
| 60. | 66. | 60. | 66. | 57. | 57. |
| 58. | 72. | 58. | 72. | 142. | 142. |
| 210. | 257. | 210. | 257. | 119. | 119. |
| | | | | 102. | 102. |
| | | | | 67. | 67. |
| | | | | 527. | 527. |
| | | | | 589. | 589. |

| 6.4 | 6.3 | 6.2 | 6.2 | 6.1 | 6.0 | 5.9 | 5.8 | 5.7 | 5.6 |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 5.6 | 5.5 | 5.4 | 5.4 | 5.3 | 5.3 | 5.2 | 5.2 | 5.1 | 5.1 |
| 5.1 | 5.0 | 5.0 | 5.0 | 5.0 | 4.9 | 4.8 | 4.9 | 4.9 | 4.9 |
| 4.9 | 4.8 | 4.8 | 4.8 | 4.8 | 4.8 | 4.8 | 4.8 | 4.8 | 4.8 |
| 4.8 | 4.8 | 4.8 | 4.8 | 4.8 | 4.8 | 4.8 | 4.8 | 4.8 | 4.8 |
| 4.8 | 4.8 | 4.8 | 4.8 | 4.8 | 4.8 | 4.8 | 4.8 | 4.8 | 4.8 |
| 4.8 | 4.8 | 4.8 | 4.8 | 4.8 | 4.8 | 4.8 | 4.8 | 4.8 | 4.8 |
| 4.8 | 4.8 | 4.8 | 4.8 | 4.8 | 4.8 | 4.8 | 4.8 | 4.8 | 4.8 |
| 4.8 | 4.8 | 4.8 | 4.8 | 4.8 | 4.8 | 4.8 | 4.8 | 4.8 | 4.8 |
| 4.8 | 4.8 | 4.8 | 4.8 | 4.8 | 4.8 | 4.8 | 4.8 | 4.8 | 4.8 |

PEAK OUTFLOW IS 2567. AT TIME 53.50 HOURS

| PEAK | 6-HOUR | 24-HOUR | 72-HOUR | TOTAL VOLUME |
|-------|--------|---------|---------|--------------|
| 2567. | 2450. | 1749. | 910. | 133234. |
| 73. | 69. | 50. | 26. | 3773. |
| | 37 | 1.06 | 1.65 | 1.68 |
| | 9.41 | 26.87 | 41.94 | 42.66 |
| | 1215. | 3468. | 5413. | 5506. |
| | 1494. | 4274. | 6677. | 6791. |

CFS
CMS
INCHES
MM
AC-FT
THOUS CU M

STATION OUTFLO. PLAN 1, RATIO 5 END-OF-PERIOD HYDROGRAPH ORDINATES

| 1. | 2. | 3. | 3. | 3. | 4. | 4. | 4. | 4. | 5. |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 5. | 5. | 4. | 4. | 4. | 4. | 4. | 4. | 4. | 5. |
| 3. | 3. | 3. | 3. | 3. | 3. | 3. | 3. | 3. | 3. |
| 2. | 2. | 2. | 2. | 2. | 2. | 2. | 2. | 2. | 2. |
| 24. | 29. | 35. | 42. | 48. | 55. | 62. | 68. | 74. | 80. |
| 85. | 91. | 93. | 96. | 98. | 99. | 100. | 100. | 100. | 99. |
| 96. | 97. | 98. | 98. | 98. | 92. | 92. | 92. | 92. | 94. |
| 97. | 100. | 104. | 110. | 119. | 130. | 146. | 167. | 196. | 232. |
| 279. | 338. | 376. | 413. | 456. | 527. | 605. | 690. | 776. | 856. |
| 323. | 1099. | 1080. | 1149. | 1267. | 1627. | 2049. | 2452. | 2795. | 3046. |
| 3263. | 3393. | 3467. | 3475. | 3487. | 3453. | 3399. | 3331. | 3253. | 3169. |
| 3081. | 2990. | 2899. | 2808. | 2718. | 2629. | 2542. | 2456. | 2373. | 2293. |
| 2215. | 2140. | 2067. | 1998. | 1931. | 1866. | 1804. | 1744. | 1687. | 1633. |
| 1500. | 1530. | 1482. | 1437. | 1394. | 1353. | 1315. | 1280. | 1248. | 1221. |
| 1194. | 1186. | 1174. | 1168. | 1158. | 1148. | 1137. | 1126. | 1114. | 1101. |
| 1084. | 1075. | 1062. | 1044. | 1033. | 1019. | 1004. | 988. | 972. | 955. |
| 939. | 922. | 904. | 887. | 869. | 852. | 834. | 815. | 797. | 776. |
| 755. | 734. | 713. | 691. | 670. | 648. | 626. | 605. | 583. | 562. |
| 541. | 521. | 501. | 481. | 461. | 447. | 434. | 421. | 408. | 395. |
| 382. | 369. | 356. | 343. | 330. | 318. | 305. | 294. | 281. | 270. |
| 173. | 157. | 143. | 130. | 118. | 107. | 97. | 88. | 80. | 72. |
| 66. | 60. | 54. | 49. | 45. | 41. | 37. | 34. | 31. | 28. |
| 24. | 23. | 21. | 20. | 18. | 16. | 15. | 14. | 13. | 12. |
| 11. | 10. | 9. | 8. | 7. | 7. | 6. | 6. | 5. | 5. |
| 5. | 4. | 4. | 4. | 4. | 3. | 3. | 3. | 3. | 2. |
| 2. | 2. | 2. | 2. | 2. | 2. | 1. | 1. | 1. | 1. |
| 1. | 1. | 1. | 1. | 1. | 1. | 1. | 1. | 1. | 1. |
| 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |

| PEAK OUTFLOW IS 3495. AT TIME 52.00 HOURS | | | | | | | | | |
|--|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 4.8 | 4.8 | 4.8 | 4.8 | 4.8 | 4.8 | 4.8 | 4.8 | 4.8 | 4.8 |
| <div> <div>PEAK</div> <div>3495.</div> <div>94.</div> </div> <div> <div>6-HOUR</div> <div>3318.</div> <div>2272.</div> <div>1136.</div> <div>32.</div> <div>2.06</div> <div>52.38</div> <div>53.32</div> <div>6882.</div> <div>8489.</div> </div> <div> <div>24-HOUR</div> <div>2272.</div> <div>1136.</div> <div>32.</div> <div>2.06</div> <div>52.38</div> <div>53.32</div> <div>6882.</div> <div>8489.</div> </div> <div> <div>72-HOUR</div> <div>1136.</div> <div>32.</div> <div>2.06</div> <div>52.38</div> <div>53.32</div> <div>6882.</div> <div>8489.</div> </div> <div> <div>TOTAL VOLUME</div> <div>166542.</div> <div>4716.</div> <div>2.10</div> <div>53.32</div> <div>6882.</div> <div>8489.</div> </div> | | | | | | | | | |
| <div> <div>THOUS CU M</div> <div>3495.</div> <div>94.</div> </div> <div> <div>AC-FT</div> <div>12.75</div> <div>34.91</div> <div>52.38</div> <div>53.32</div> <div>6882.</div> <div>8489.</div> </div> <div> <div>INCHES</div> <div>1645.</div> <div>4506.</div> <div>6760.</div> <div>8339.</div> </div> <div> <div>CFS</div> <div>3318.</div> <div>2272.</div> <div>1136.</div> <div>32.</div> <div>2.06</div> <div>52.38</div> <div>53.32</div> <div>6882.</div> <div>8489.</div> </div> | | | | | | | | | |

STATION OUTFLO. PLAN 1, RATIO 6
END-OF-PERIOD HYDROGRAPH ORIGINATES

| STATION OUTFLO. PLAN 1, RATIO 6 | | | | | | | | | |
|-------------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| END-OF-PERIOD HYDROGRAPH ORIGINATES | | | | | | | | | |
| OUTFLOW | | | | | | | | | |
| 3. | 5. | 7. | 9. | 11. | 10. | 11. | 11. | 4.0 | 4.8 |
| 11. | 11. | 11. | 11. | 11. | 10. | 10. | 11. | 4.0 | 4.8 |
| 8. | 8. | 8. | 7. | 7. | 6. | 6. | 9. | 4.0 | 4.8 |
| 5. | 5. | 5. | 9. | 9. | 13. | 19. | 35. | 4.0 | 4.8 |
| 56. | 72. | 87. | 118. | 102. | 134. | 150. | 166. | 4.0 | 4.8 |
| 207. | 218. | 227. | 239. | 234. | 243. | 245. | 246. | 4.0 | 4.8 |
| 242. | 240. | 237. | 234. | 234. | 230. | 229. | 229. | 4.0 | 4.8 |
| 240. | 240. | 248. | 271. | 271. | 316. | 351. | 371. | 4.0 | 4.8 |
| 488. | 569. | 669. | 890. | 890. | 1004. | 1117. | 1357. | 4.0 | 4.8 |
| 4493. | 5576. | 6551. | 7404. | 8128. | 8724. | 9189. | 9530. | 4.0 | 4.8 |
| 9872. | 9793. | 9647. | 9451. | 9219. | 8965. | 8699. | 8426. | 4.0 | 4.8 |
| 7613. | 7351. | 7094. | 6844. | 6601. | 6364. | 6136. | 5915. | 4.0 | 4.8 |
| 5296. | 5104. | 4919. | 4738. | 4565. | 4399. | 4239. | 4085. | 4.0 | 4.8 |
| 3659. | 3527. | 3398. | 3275. | 3157. | 3043. | 2934. | 2829. | 4.0 | 4.8 |
| 2539. | 2463. | 2363. | 2280. | 2201. | 2125. | 2052. | 1982. | 4.0 | 4.8 |
| 1788. | 1729. | 1672. | 1618. | 1566. | 1517. | 1470. | 1425. | 4.0 | 4.8 |
| 1306. | 1272. | 1241. | 1214. | 1194. | 1184. | 1175. | 1165. | 4.0 | 4.8 |
| 1132. | 1120. | 1107. | 1094. | 1079. | 1064. | 1048. | 1031. | 4.0 | 4.8 |
| 977. | 957. | 937. | 917. | 896. | 875. | 853. | 832. | 4.0 | 4.8 |
| 761. | 736. | 711. | 685. | 661. | 636. | 611. | 587. | 4.0 | 4.8 |
| 518. | 496. | 474. | 455. | 441. | 427. | 413. | 399. | 4.0 | 4.8 |
| 357. | 335. | 305. | 277. | 251. | 227. | 205. | 185. | 4.0 | 4.8 |
| 134. | 123. | 111. | 100. | 90. | 81. | 73. | 66. | 4.0 | 4.8 |
| 48. | 43. | 39. | 35. | 32. | 29. | 26. | 24. | 4.0 | 4.8 |
| 18. | 16. | 15. | 13. | 12. | 11. | 10. | 9. | 4.0 | 4.8 |
| 7. | 7. | 6. | 5. | 5. | 5. | 4. | 4. | 4.0 | 4.8 |
| 3. | 3. | 3. | 2. | 2. | 2. | 2. | 2. | 4.0 | 4.8 |
| 1. | 1. | 1. | 1. | 1. | 1. | 1. | 1. | 4.0 | 4.8 |
| 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 4.0 | 4.8 |
| STORAGE | | | | | | | | | |
| 1. | 2. | 2. | 3. | 3. | 3. | 3. | 3. | 3. | 3. |
| 3. | 3. | 3. | 3. | 3. | 3. | 3. | 3. | 3. | 3. |
| 2. | 2. | 2. | 2. | 2. | 2. | 2. | 2. | 2. | 2. |
| 1. | 1. | 1. | 1. | 1. | 1. | 1. | 1. | 1. | 1. |
| 18. | 22. | 27. | 32. | 37. | 42. | 48. | 53. | 58. | 63. |
| 67. | 71. | 75. | 79. | 80. | 81. | 81. | 81. | 81. | 81. |
| 80. | 74. | 78. | 77. | 76. | 76. | 75. | 75. | 76. | 77. |
| 79. | 82. | 86. | 91. | 98. | 108. | 122. | 141. | 169. | 206. |
| 257. | 323. | 409. | 515. | 643. | 796. | 975. | 1176. | 1383. | 1579. |
| 1755. | 1909. | 2041. | 2152. | 2244. | 2318. | 2375. | 2444. | 2457. | 2457. |

[illegible]

PEAK OUTFLOW IS 9A72. AT TIME 50.50 HOURS

| PEAK | 6-HOUR | 24-HOUR | 72-HOUR | TOTAL VOLUME |
|-------|--------|---------|---------|--------------|
| 9872. | 9380. | 3366. | 2829. | 416845. |
| 280. | 266. | 180. | 80. | 117845. |
| | 1.42 | 3.85 | 5.13 | 5.25 |
| | 36.04 | 97.84 | 130.40 | 133.28 |
| | 4651. | 12628. | 16431. | 17202. |

THOUS CU M

5737.

15576.

20761.

21218.

STATION OUTFLO, PLAN 1, RATIO 7

END-OF-PERIOD HYDROGRAPH ORDINATES

| | 5. | 10. | 14. | 17. | OUTFLOW | | | | 20. | 21. | 22. | 23. | 23. |
|--------|--------|--------|--------|--------|---------|--------|--------|--------|--------|--------|--------|--------|--------|
| 23. | 23. | 22. | 22. | 22. | 19. | 21. | 20. | 21. | 19. | 19. | 19. | 23. | 23. |
| 17. | 17. | 16. | 15. | 14. | 14. | 14. | 13. | 12. | 11. | 11. | 11. | 17. | 17. |
| 10. | 9. | 10. | 10. | 13. | 18. | 26. | 26. | 38. | 52. | 52. | 52. | 10. | 10. |
| 116. | 142. | 170. | 200. | 200. | 230. | 261. | 261. | 291. | 320. | 320. | 320. | 70. | 92. |
| 371. | 381. | 390. | 397. | 397. | 408. | 410. | 410. | 414. | 417. | 417. | 420. | 348. | 422. |
| 423. | 424. | 424. | 424. | 424. | 424. | 424. | 424. | 424. | 426. | 426. | 426. | 420. | 422. |
| 437. | 444. | 453. | 466. | 466. | 489. | 489. | 520. | 560. | 613. | 613. | 613. | 681. | 765. |
| 859. | 967. | 1086. | 1276. | 1276. | 2313. | 3835. | 3835. | 5559. | 7338. | 7338. | 9126. | 9126. | 10865. |
| 12511. | 14038. | 15425. | 16650. | 16650. | 17698. | 19557. | 19557. | 19225. | 19701. | 19701. | 19984. | 20073. | 20073. |
| 19979. | 19734. | 19371. | 18921. | 18921. | 18412. | 17867. | 17867. | 17305. | 16737. | 16737. | 16171. | 15612. | 15612. |
| 15064. | 14568. | 14007. | 13500. | 13500. | 13009. | 12533. | 12533. | 12073. | 11629. | 11629. | 11199. | 10744. | 10744. |
| 10385. | 10001. | 9632. | 9276. | 9276. | 8934. | 8604. | 8604. | 8287. | 7982. | 7982. | 7691. | 7410. | 7410. |
| 7139. | 6876. | 6620. | 6374. | 6374. | 6138. | 5911. | 5911. | 5693. | 5484. | 5484. | 5283. | 5091. | 5091. |
| 4904. | 4723. | 4550. | 4384. | 4384. | 4224. | 4071. | 4071. | 3923. | 3782. | 3782. | 3646. | 3515. | 3515. |
| 3389. | 3268. | 3151. | 3039. | 3039. | 2931. | 2827. | 2827. | 2728. | 2632. | 2632. | 2539. | 2449. | 2449. |
| 2363. | 2280. | 2199. | 2121. | 2121. | 2046. | 1973. | 1973. | 1904. | 1837. | 1837. | 1773. | 1711. | 1711. |
| 1653. | 1596. | 1540. | 1481. | 1481. | 1422. | 1365. | 1365. | 1312. | 1264. | 1264. | 1223. | 1193. | 1193. |
| 1180. | 1154. | 1139. | 1124. | 1124. | 1108. | 1092. | 1092. | 1075. | 1057. | 1057. | 1039. | 1039. | 1039. |
| 1020. | 1001. | 981. | 960. | 960. | 939. | 917. | 917. | 895. | 873. | 873. | 851. | 828. | 828. |
| 806. | 780. | 754. | 728. | 728. | 702. | 677. | 677. | 651. | 626. | 626. | 601. | 576. | 576. |
| 552. | 529. | 507. | 484. | 484. | 462. | 447. | 447. | 433. | 418. | 418. | 404. | 390. | 390. |
| 376. | 362. | 346. | 335. | 335. | 326. | 313. | 313. | 304. | 291. | 291. | 274. | 260. | 260. |
| 155. | 140. | 126. | 113. | 113. | 102. | 91. | 91. | 82. | 74. | 74. | 67. | 60. | 60. |
| 54. | 48. | 44. | 39. | 39. | 35. | 32. | 32. | 29. | 26. | 26. | 24. | 21. | 21. |
| 19. | 18. | 16. | 14. | 14. | 13. | 12. | 12. | 11. | 10. | 10. | 9. | 8. | 8. |
| 8. | 7. | 6. | 5. | 5. | 5. | 5. | 5. | 4. | 4. | 4. | 4. | 3. | 3. |
| 3. | 3. | 3. | 3. | 3. | 2. | 2. | 2. | 2. | 2. | 2. | 2. | 2. | 2. |
| 1. | 1. | 1. | 1. | 1. | 1. | 1. | 1. | 1. | 1. | 1. | 1. | 1. | 1. |
| 1. | 1. | 1. | 1. | 1. | 1. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |

STORAGE

| | 2. | 3. | 4. | 5. | STORAGE | | | | 6. | 7. | 7. | 7. | 7. |
|-------|-------|-------|-------|-------|---------|-------|-------|-------|-------|-------|-------|-------|-------|
| 2. | 2. | 3. | 4. | 5. | 6. | 6. | 6. | 6. | 6. | 7. | 7. | 7. | 7. |
| 5. | 5. | 5. | 5. | 4. | 4. | 4. | 4. | 4. | 4. | 6. | 5. | 5. | 5. |
| 36. | 45. | 55. | 65. | 76. | 87. | 98. | 109. | 116. | 122. | 122. | 120. | 131. | 28. |
| 141. | 151. | 160. | 168. | 175. | 180. | 185. | 189. | 196. | 198. | 198. | 192. | 193. | 204. |
| 195. | 200. | 204. | 208. | 212. | 215. | 218. | 221. | 224. | 226. | 226. | 220. | 204. | 204. |
| 210. | 217. | 224. | 230. | 236. | 242. | 248. | 254. | 260. | 266. | 266. | 260. | 244. | 244. |
| 265. | 274. | 283. | 292. | 301. | 310. | 319. | 328. | 337. | 346. | 346. | 340. | 324. | 324. |
| 276. | 284. | 293. | 302. | 311. | 320. | 329. | 338. | 347. | 356. | 356. | 350. | 334. | 334. |
| 305. | 314. | 323. | 332. | 341. | 350. | 359. | 368. | 377. | 386. | 386. | 380. | 364. | 364. |
| 360. | 369. | 378. | 387. | 396. | 405. | 414. | 423. | 432. | 441. | 441. | 435. | 419. | 419. |
| 390. | 400. | 410. | 420. | 430. | 440. | 450. | 460. | 470. | 480. | 480. | 474. | 458. | 458. |
| 420. | 430. | 440. | 450. | 460. | 470. | 480. | 490. | 500. | 510. | 510. | 504. | 488. | 488. |
| 450. | 460. | 470. | 480. | 490. | 500. | 510. | 520. | 530. | 540. | 540. | 534. | 518. | 518. |
| 480. | 490. | 500. | 510. | 520. | 530. | 540. | 550. | 560. | 570. | 570. | 564. | 548. | 548. |
| 510. | 520. | 530. | 540. | 550. | 560. | 570. | 580. | 590. | 600. | 600. | 594. | 578. | 578. |
| 540. | 550. | 560. | 570. | 580. | 590. | 600. | 610. | 620. | 630. | 630. | 624. | 608. | 608. |
| 570. | 580. | 590. | 600. | 610. | 620. | 630. | 640. | 650. | 660. | 660. | 654. | 638. | 638. |
| 600. | 610. | 620. | 630. | 640. | 650. | 660. | 670. | 680. | 690. | 690. | 684. | 668. | 668. |
| 630. | 640. | 650. | 660. | 670. | 680. | 690. | 700. | 710. | 720. | 720. | 714. | 698. | 698. |
| 660. | 670. | 680. | 690. | 700. | 710. | 720. | 730. | 740. | 750. | 750. | 744. | 728. | 728. |
| 690. | 700. | 710. | 720. | 730. | 740. | 750. | 760. | 770. | 780. | 780. | 774. | 758. | 758. |
| 720. | 730. | 740. | 750. | 760. | 770. | 780. | 790. | 800. | 810. | 810. | 804. | 788. | 788. |
| 750. | 760. | 770. | 780. | 790. | 800. | 810. | 820. | 830. | 840. | 840. | 834. | 818. | 818. |
| 780. | 790. | 800. | 810. | 820. | 830. | 840. | 850. | 860. | 870. | 870. | 864. | 848. | 848. |
| 810. | 820. | 830. | 840. | 850. | 860. | 870. | 880. | 890. | 900. | 900. | 894. | 878. | 878. |
| 840. | 850. | 860. | 870. | 880. | 890. | 900. | 910. | 920. | 930. | 930. | 924. | 908. | 908. |
| 870. | 880. | 890. | 900. | 910. | 920. | 930. | 940. | 950. | 960. | 960. | 954. | 938. | 938. |
| 900. | 910. | 920. | 930. | 940. | 950. | 960. | 970. | 980. | 990. | 990. | 984. | 968. | 968. |
| 930. | 940. | 950. | 960. | 970. | 980. | 990. | 1000. | 1010. | 1020. | 1020. | 1014. | 998. | 998. |
| 960. | 970. | 980. | 990. | 1000. | 1010. | 1020. | 1030. | 1040. | 1050. | 1050. | 1044. | 1028. | 1028. |
| 990. | 1000. | 1010. | 1020. | 1030. | 1040. | 1050. | 1060. | 1070. | 1080. | 1080. | 1074. | 1058. | 1058. |
| 1020. | 1030. | 1040. | 1050. | 1060. | 1070. | 1080. | 1090. | 1100. | 1110. | 1110. | 1104. | 1088. | 1088. |
| 1050. | 1060. | 1070. | 1080. | 1090. | 1100. | 1110. | 1120. | 1130. | 1140. | 1140. | 1134. | 1118. | 1118. |
| 1080. | 1090. | 1100. | 1110. | 1120. | 1130. | 1140. | 1150. | 1160. | 1170. | 1170. | 1164. | 1148. | 1148. |
| 1110. | 1120. | 1130. | 1140. | 1150. | 1160. | 1170. | 1180. | 1190. | 1200. | 1200. | 1194. | 1178. | 1178. |
| 1140. | 1150. | 1160. | 1170. | 1180. | 1190. | 1200. | 1210. | 1220. | 1230. | 1230. | 1224. | 1208. | 1208. |
| 1170. | 1180. | 1190. | 1200. | 1210. | 1220. | 1230. | 1240. | 1250. | 1260. | 1260. | 1254. | 1238. | 1238. |
| 1200. | 1210. | 1220. | 1230. | 1240. | 1250. | 1260. | 1270. | 1280. | 1290. | 1290. | 1284. | 1268. | 1268. |
| 1230. | 1240. | 1250. | 1260. | 1270. | 1280. | 1290. | 1300. | 1310. | 1320. | 1320. | 1314. | 1298. | 1298. |
| 1260. | 1270. | 1280. | 1290. | 1300. | 1310. | 1320. | 1330. | 1340. | 1350. | 1350. | 1344. | 1328. | 1328. |
| 1290. | 1300. | 1310. | 1320. | 1330. | 1340. | 1350. | 1360. | 1370. | 1380. | 1380. | 1374. | 1358. | 1358. |
| 1320. | 1330. | 1340. | 1350. | 1360. | 1370. | 1380. | 1390. | 1400. | 1410. | 1410. | 1404. | 1388. | 1388. |
| 1350. | 1360. | 1370. | 1380. | 1390. | 1400. | 1410. | 1420. | 1430. | 1440. | 1440. | 1434. | 1418. | 1418. |
| 1380. | 1390. | 1400. | 1410. | 1420. | 1430. | 1440. | 1450. | 1460. | 1470. | 1470. | 1464. | 1448. | 1448. |
| 1410. | 1420. | 1430. | 1440. | 1450. | 1460. | 1470. | 1480. | 1490. | 1500. | 1500. | 1494. | 1478. | 1478. |
| 1440. | 1450. | 1460. | 1470. | 1480. | 1490. | 1500. | 1510. | 1520. | 1530. | 1530. | 1524. | 1508. | 1508. |
| 1470. | 1480. | 1490. | 1500. | 1510. | 1520. | 1530. | 1540. | 1550. | 1560. | 1560. | 1554. | 1538. | 1538. |
| 1500. | 1510. | 1520. | 1530. | 1540. | 1550. | 1560. | 1570. | 1580. | 1590. | 1590. | 1584. | 1568. | 1568. |
| 1530. | 1540. | 1550. | 1560. | 1570. | 1580. | 1590. | 1600. | 1610. | 1620. | 1620. | 1614. | 1598. | 1598. |
| 1560. | 1570. | 1580. | 1590. | 1600. | 1610. | 1620. | 1630. | 1640. | 1650. | 1650. | 1644. | 1628. | 1628. |
| 1590. | 1600. | 1610. | 1620. | 1630. | 1640. | 1650. | 1660. | 1670. | 1680. | 1680. | 1674. | 1658. | 1658. |
| 1620. | 1630. | 1640. | 1650. | 1660. | 1670. | 1680. | 1690. | 1700. | 1710. | 1710. | 1704. | 1688. | 1688. |
| 1650. | 1660. | 1670. | 1680. | 1690. | 1700. | 1710. | 1720. | 1730. | 1740. | 1740. | 1734. | 1718. | 1718. |
| 1680. | 1690. | 1700. | 1710. | 1720. | 1730. | 1740. | 1750. | 1760. | 1770. | 1770. | 1764. | 1748. | 1748. |
| 1710. | 1720. | 1730. | 1740. | 1750. | 1760. | 1770. | 1780. | 1790. | 1800. | 1800. | 1794. | 1778. | 1778. |
| 1740. | 1750. | 1760. | 1770. | 1780. | 1790. | 1800. | 1810. | 1820. | 1830. | 1830. | 1824. | 1808. | 1808. |
| 1770. | 1780. | 1790. | 1800. | 1810. | 1820. | 1830. | 1840. | 1850. | 1860. | 1860. | 1854. | 1838. | 1838. |
| 1800. | 1810. | 1820. | 1830. | 1840. | 1850. | 1860. | 1870. | 1880. | 1890. | 1890. | 1884. | 1868. | 1868. |
| 1830. | 1840. | 1850. | 1860. | 1870. | 1880. | 1890. | 1900. | 1910. | 1920. | 1920. | 1914. | 1898. | 1898. |
| 1860. | 1870. | 1880. | 1890. | 1900. | 1910. | 1920. | 1930. | 1940. | 1950. | 1950. | 1944. | 1928. | 1928. |
| 1890. | 1900. | 1910. | 1920. | 1930. | 1940. | 1950. | 1960. | 1970. | 1980. | 1980. | 1974. | 1958. | 1958. |
| 1920. | 1930. | 1940. | 1950. | 1960. | 1970. | 1980. | 1990. | 2000. | 2010. | 2010. | 2004. | 1988. | 1988. |
| 1950. | 1960. | 1970. | 1980. | 1990. | 2000. | 2010. | 2020. | 2030. | 2040. | 2040. | 2034. | 2018. | 2018. |
| 1980. | 1990. | 2000. | 2010. | 2020. | 2030. | 2040. | 2050. | 2060. | 2070. | 2070. | 2064. | 2048. | 2048. |
| 2010. | 2020. | 2030. | 2040. | 2050. | 2060. | 2070. | 2080. | 2090. | 2100. | 2100. | 2094. | 2078. | 2078. |
| 2040. | 2050. | 2060. | 2070. | 2080. | 2090. | 2100. | 2110. | 2120. | 2130. | 2130. | 2124. | 2108. | 2108. |
| 2070. | 2080. | 2090. | 2100. | 2110. | 2120. | 2130. | 2140. | 2150. | 2160. | 2160. | 2154. | 2138. | 2138. |

| | | | | | | | | | |
|------|------|------|------|------|------|------|------|------|------|
| 309. | 290. | 212. | 254. | 237. | 221. | 205. | 190. | 175. | 160. |
| 146. | 133. | 119. | 107. | 96. | 86. | 77. | 69. | 62. | 55. |
| 49. | 44. | 40. | 35. | 32. | 28. | 25. | 23. | 20. | 18. |
| 16. | 15. | 13. | 12. | 11. | 10. | 9. | 8. | 7. | 6. |
| 6. | 5. | 5. | 4. | 4. | 4. | 3. | 3. | 3. | 2. |
| 2. | 2. | 2. | 2. | 2. | 1. | 1. | 1. | 1. | 1. |
| 1. | 1. | 1. | 1. | 1. | 1. | 1. | 1. | 1. | 0. |
| 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |
| 4.8 | 4.8 | 4.8 | 4.8 | 4.8 | 4.8 | 4.8 | 4.8 | 4.8 | 4.8 |
| 4.8 | 4.8 | 4.8 | 4.8 | 4.8 | 4.8 | 4.8 | 4.8 | 4.8 | 4.8 |
| 4.8 | 4.8 | 4.8 | 4.8 | 4.8 | 4.8 | 4.8 | 4.8 | 4.8 | 4.8 |
| 5.1 | 5.2 | 5.2 | 5.3 | 5.4 | 5.5 | 5.6 | 5.7 | 5.7 | 5.8 |
| 5.9 | 6.0 | 6.0 | 6.1 | 6.1 | 6.2 | 6.2 | 6.2 | 6.2 | 6.2 |
| 6.2 | 6.3 | 6.3 | 6.3 | 6.3 | 6.3 | 6.3 | 6.3 | 6.3 | 6.3 |
| 6.3 | 6.4 | 6.4 | 6.5 | 6.6 | 6.8 | 7.0 | 7.2 | 7.5 | 7.8 |
| 8.3 | 8.8 | 9.5 | 10.1 | 10.9 | 11.6 | 12.2 | 12.8 | 13.3 | 13.8 |
| 14.2 | 14.6 | 15.0 | 15.2 | 15.5 | 15.7 | 15.8 | 15.9 | 16.0 | 16.0 |
| 16.0 | 15.4 | 15.8 | 15.8 | 15.6 | 15.5 | 15.4 | 15.3 | 15.1 | 15.0 |
| 14.9 | 14.7 | 14.6 | 14.5 | 14.4 | 14.2 | 14.1 | 14.0 | 13.9 | 13.8 |
| 13.7 | 13.6 | 13.5 | 13.4 | 13.3 | 13.2 | 13.1 | 13.0 | 12.9 | 12.8 |
| 12.7 | 12.6 | 12.6 | 12.5 | 12.4 | 12.3 | 12.3 | 12.2 | 12.1 | 12.0 |
| 12.0 | 11.9 | 11.8 | 11.8 | 11.7 | 11.7 | 11.6 | 11.5 | 11.5 | 11.4 |
| 11.4 | 11.3 | 11.3 | 11.2 | 11.2 | 11.1 | 11.1 | 11.0 | 11.0 | 10.9 |
| 10.9 | 10.8 | 10.8 | 10.8 | 10.7 | 10.7 | 10.6 | 10.6 | 10.5 | 10.5 |
| 10.5 | 10.4 | 10.4 | 10.3 | 10.3 | 10.2 | 10.2 | 10.1 | 10.1 | 10.0 |
| 9.9 | 9.9 | 9.8 | 9.7 | 9.7 | 9.6 | 9.5 | 9.4 | 9.3 | 9.2 |
| 9.1 | 9.0 | 8.9 | 8.8 | 8.7 | 8.6 | 8.5 | 8.4 | 8.3 | 8.1 |
| 8.0 | 7.9 | 7.8 | 7.7 | 7.7 | 7.5 | 7.4 | 7.2 | 7.1 | 7.0 |
| 6.9 | 6.8 | 6.7 | 6.6 | 6.5 | 6.4 | 6.3 | 6.2 | 6.1 | 6.0 |
| 5.9 | 5.8 | 5.7 | 5.6 | 5.6 | 5.5 | 5.4 | 5.4 | 5.3 | 5.2 |
| 5.2 | 5.1 | 5.1 | 5.1 | 5.0 | 5.0 | 5.0 | 5.0 | 4.9 | 4.9 |
| 4.9 | 4.9 | 4.9 | 4.9 | 4.9 | 4.8 | 4.8 | 4.8 | 4.8 | 4.8 |
| 4.8 | 4.8 | 4.8 | 4.8 | 4.8 | 4.8 | 4.8 | 4.8 | 4.8 | 4.8 |
| 4.8 | 4.8 | 4.8 | 4.8 | 4.8 | 4.8 | 4.8 | 4.8 | 4.8 | 4.8 |
| 4.8 | 4.8 | 4.8 | 4.8 | 4.8 | 4.8 | 4.8 | 4.8 | 4.8 | 4.8 |
| 4.8 | 4.8 | 4.8 | 4.8 | 4.8 | 4.8 | 4.8 | 4.8 | 4.8 | 4.8 |
| 4.8 | 4.8 | 4.8 | 4.8 | 4.8 | 4.8 | 4.8 | 4.8 | 4.8 | 4.8 |

PEAK OUTFLOW IS 20073. AT TIME 50.00 HOURS

| PEAK | 6-HOUR | 24-HOUR | 72-HOUR | TOTAL VOLUME |
|--------|--------|---------|---------|--------------|
| 20073. | 19111. | 13139. | 5653. | 832519. |
| 568. | 541. | 372. | 160. | 23574. |
| | 2.89 | 7.95 | 10.26 | 10.49 |
| | 73.42 | 201.92 | 260.64 | 266.54 |
| | 9476. | 26061. | 33640. | 34402. |
| | 11689. | 32146. | 41495. | 42434. |

STATION OUTFLOW, PLAN 1, RATIO 8
END-OF-PERIOD HYDROGRAPH ORDINATES

| INCHES | MM | AC-FT | THOUS CU M |
|--------|------|-------|------------|
| 15. | 38. | 20. | 34. |
| 25. | 64. | 32. | 52. |
| 30. | 76. | 36. | 62. |
| 31. | 79. | 37. | 64. |
| 32. | 81. | 38. | 66. |
| 33. | 84. | 39. | 68. |
| 34. | 86. | 40. | 70. |
| 35. | 89. | 41. | 72. |
| 36. | 91. | 42. | 74. |
| 37. | 94. | 43. | 76. |
| 38. | 96. | 44. | 78. |
| 39. | 99. | 45. | 80. |
| 40. | 101. | 46. | 82. |
| 41. | 104. | 47. | 84. |
| 42. | 106. | 48. | 86. |
| 43. | 109. | 49. | 88. |
| 44. | 111. | 50. | 90. |
| 45. | 114. | 51. | 92. |
| 46. | 116. | 52. | 94. |
| 47. | 119. | 53. | 96. |
| 48. | 121. | 54. | 98. |
| 49. | 124. | 55. | 100. |
| 50. | 126. | 56. | 102. |
| 51. | 129. | 57. | 104. |
| 52. | 131. | 58. | 106. |
| 53. | 134. | 59. | 108. |
| 54. | 136. | 60. | 110. |
| 55. | 139. | 61. | 112. |
| 56. | 141. | 62. | 114. |
| 57. | 144. | 63. | 116. |
| 58. | 146. | 64. | 118. |
| 59. | 149. | 65. | 120. |
| 60. | 151. | 66. | 122. |
| 61. | 154. | 67. | 124. |
| 62. | 156. | 68. | 126. |
| 63. | 159. | 69. | 128. |
| 64. | 161. | 70. | 130. |
| 65. | 164. | 71. | 132. |
| 66. | 166. | 72. | 134. |
| 67. | 169. | 73. | 136. |
| 68. | 171. | 74. | 138. |
| 69. | 174. | 75. | 140. |
| 70. | 176. | 76. | 142. |
| 71. | 179. | 77. | 144. |
| 72. | 181. | 78. | 146. |
| 73. | 184. | 79. | 148. |
| 74. | 186. | 80. | 150. |
| 75. | 189. | 81. | 152. |
| 76. | 191. | 82. | 154. |
| 77. | 194. | 83. | 156. |
| 78. | 196. | 84. | 158. |
| 79. | 199. | 85. | 160. |
| 80. | 201. | 86. | 162. |
| 81. | 204. | 87. | 164. |
| 82. | 206. | 88. | 166. |
| 83. | 209. | 89. | 168. |
| 84. | 211. | 90. | 170. |
| 85. | 214. | 91. | 172. |
| 86. | 216. | 92. | 174. |
| 87. | 219. | 93. | 176. |
| 88. | 221. | 94. | 178. |
| 89. | 224. | 95. | 180. |
| 90. | 226. | 96. | 182. |
| 91. | 229. | 97. | 184. |
| 92. | 231. | 98. | 186. |
| 93. | 234. | 99. | 188. |
| 94. | 236. | 100. | 190. |

SH23

| | | | | | | | | | |
|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 25. | 24. | 23. | 21. | 20. | 19. | 18. | 17. | 16. | 15. |
| 14. | 14. | 15. | 19. | 27. | 39. | 56. | 78. | 105. | 136. |
| 171. | 204. | 249. | 292. | 335. | 362. | 381. | 400. | 419. | 438. |
| 456. | 478. | 500. | 519. | 535. | 549. | 561. | 570. | 578. | 584. |
| 584. | 592. | 594. | 596. | 598. | 600. | 603. | 607. | 613. | 622. |
| 633. | 647. | 664. | 686. | 716. | 753. | 805. | 863. | 935. | 1023. |
| 1126. | 1431. | 2595. | 4240. | 6188. | 8323. | 10595. | 12912. | 15232. | 17519. |
| 19224. | 21814. | 23729. | 25438. | 26900. | 28106. | 29042. | 29704. | 30046. | 30186. |
| 30019. | 29628. | 29065. | 28374. | 27596. | 26766. | 25912. | 25050. | 24193. | 23348. |
| 22520. | 21712. | 20926. | 20162. | 19422. | 18706. | 18014. | 17346. | 16701. | 16080. |
| 15442. | 14906. | 14352. | 13819. | 13308. | 12812. | 12336. | 11879. | 11438. | 11012. |
| 10603. | 10206. | 9821. | 9452. | 9097. | 8756. | 8429. | 8116. | 7817. | 7530. |
| 7254. | 6948. | 6732. | 6486. | 6249. | 6021. | 5801. | 5590. | 5386. | 5190. |
| 5002. | 4818. | 4641. | 4472. | 4309. | 4152. | 4002. | 3857. | 3718. | 3585. |
| 3455. | 3330. | 3204. | 3090. | 2977. | 2867. | 2761. | 2659. | 2561. | 2466. |
| 2374. | 2286. | 2196. | 2099. | 2000. | 1901. | 1807. | 1717. | 1632. | 1552. |
| 1477. | 1408. | 1345. | 1290. | 1241. | 1204. | 1185. | 1172. | 1158. | 1143. |
| 1124. | 1112. | 1095. | 1078. | 1060. | 1042. | 1023. | 1004. | 983. | 962. |
| 941. | 919. | 897. | 875. | 853. | 830. | 807. | 782. | 756. | 730. |
| 704. | 678. | 653. | 627. | 602. | 577. | 554. | 530. | 508. | 485. |
| 463. | 448. | 433. | 419. | 405. | 390. | 376. | 362. | 347. | 315. |
| 286. | 259. | 234. | 212. | 191. | 172. | 155. | 139. | 126. | 113. |
| 102. | 91. | 82. | 74. | 66. | 60. | 54. | 48. | 44. | 39. |
| 35. | 32. | 29. | 26. | 24. | 21. | 19. | 17. | 16. | 14. |
| 13. | 12. | 11. | 10. | 9. | 8. | 8. | 7. | 6. | 6. |
| 5. | 5. | 4. | 4. | 4. | 3. | 3. | 3. | 3. | 3. |
| 2. | 2. | 2. | 2. | 2. | 2. | 1. | 1. | 1. | 1. |
| 1. | 1. | 1. | 1. | 1. | 1. | 1. | 1. | 1. | 1. |

STORAGE

| | | | | | | | | | |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 2. | 5. | 6. | 7. | 8. | 9. | 10. | 10. | 10. | 10. |
| 10. | 10. | 10. | 10. | 10. | 9. | 9. | 9. | 8. | 8. |
| 8. | 7. | 7. | 6. | 6. | 6. | 5. | 5. | 5. | 5. |
| 4. | 4. | 5. | 6. | 8. | 12. | 17. | 24. | 33. | 43. |
| 55. | 68. | 83. | 99. | 115. | 133. | 151. | 171. | 191. | 211. |
| 231. | 249. | 269. | 282. | 295. | 307. | 316. | 324. | 331. | 336. |
| 339. | 342. | 346. | 345. | 347. | 349. | 351. | 355. | 360. | 367. |
| 377. | 389. | 405. | 425. | 452. | 489. | 540. | 609. | 701. | 825. |
| 989. | 1202. | 1451. | 1717. | 1992. | 2269. | 2544. | 2815. | 3079. | 3334. |
| 3578. | 3805. | 4013. | 4197. | 4355. | 4494. | 4585. | 4656. | 4697. | 4707. |
| 4689. | 4647. | 4587. | 4513. | 4429. | 4340. | 4248. | 4155. | 4063. | 3972. |
| 3802. | 3746. | 3709. | 3625. | 3544. | 3465. | 3389. | 3315. | 3243. | 3174. |
| 3107. | 3042. | 2979. | 2919. | 2860. | 2803. | 2748. | 2695. | 2643. | 2593. |
| 2545. | 2498. | 2452. | 2407. | 2364. | 2322. | 2282. | 2243. | 2205. | 2169. |
| 2133. | 2098. | 2065. | 2032. | 2000. | 1970. | 1940. | 1910. | 1882. | 1854. |
| 1828. | 1801. | 1776. | 1751. | 1728. | 1704. | 1682. | 1660. | 1638. | 1617. |
| 1597. | 1577. | 1557. | 1537. | 1518. | 1499. | 1481. | 1462. | 1445. | 1427. |
| 1410. | 1393. | 1376. | 1357. | 1336. | 1315. | 1294. | 1273. | 1253. | 1232. |
| 1212. | 1192. | 1172. | 1152. | 1131. | 1111. | 1094. | 1067. | 1043. | 1018. |
| 942. | 945. | 939. | 910. | 882. | 854. | 825. | 796. | 767. | 738. |
| 704. | 681. | 652. | 624. | 597. | 569. | 542. | 516. | 490. | 465. |
| 441. | 417. | 394. | 372. | 351. | 330. | 310. | 293. | 273. | 255. |
| 238. | 222. | 208. | 190. | 175. | 161. | 147. | 133. | 120. | 108. |
| 94. | 86. | 77. | 69. | 62. | 55. | 49. | 44. | 40. | 35. |
| 32. | 28. | 25. | 23. | 20. | 18. | 16. | 15. | 13. | 12. |
| 11. | 10. | 9. | 8. | 7. | 6. | 6. | 5. | 5. | 4. |
| 4. | 4. | 3. | 3. | 3. | 2. | 2. | 2. | 2. | 2. |
| 2. | 1. | 1. | 1. | 1. | 1. | 1. | 1. | 1. | 1. |
| 1. | 1. | 1. | 1. | 1. | 0. | 0. | 0. | 0. | 0. |
| 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |

STAGE

SH 24

| | | | | | | | | |
|-------|--------|--------|--------|--------|--------|--------|--------|-------|
| 1345. | 13032. | 12540. | 12067. | 11513. | 11175. | 10756. | 10355. | 9969. |
| 9244. | 8902. | 8573. | 8256. | 7932. | 7662. | 7342. | 7112. | 6852. |
| 6360. | 5905. | 5628. | 5482. | 5283. | 5091. | 4905. | 4725. | 4525. |
| 4551. | 4219. | 4061. | 3909. | 3762. | 3620. | 3483. | 3325. | 3225. |
| 3103. | 2864. | 2732. | 2596. | 2459. | 2328. | 2202. | 2083. | 1970. |
| 1864. | 1671. | 1585. | 1505. | 1432. | 1366. | 1306. | 1255. | 1213. |
| 1184. | 1161. | 1147. | 1132. | 1116. | 1094. | 1082. | 1064. | 1046. |
| 1027. | 984. | 967. | 945. | 924. | 902. | 880. | 857. | 835. |
| 812. | 788. | 773. | 759. | 746. | 732. | 718. | 707. | 693. |
| 558. | 535. | 512. | 490. | 468. | 446. | 422. | 407. | 393. |
| 374. | 351. | 321. | 292. | 264. | 239. | 216. | 195. | 176. |
| 154. | 128. | 115. | 104. | 93. | 84. | 75. | 68. | 61. |
| 55. | 44. | 36. | 32. | 29. | 26. | 24. | 22. | 20. |
| 20. | 15. | 13. | 12. | 11. | 10. | 9. | 8. | 7. |
| 8. | 6. | 5. | 5. | 5. | 4. | 4. | 4. | 4. |
| 3. | 3. | 3. | 2. | 2. | 2. | 2. | 2. | 2. |
| 1. | 1. | 1. | 1. | 1. | 1. | 1. | 1. | 1. |

| | | | | | | | | | |
|---------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| STORAGE | | | | | | | | | |
| 3. | 6. | 8. | 10. | 11. | 12. | 13. | 14. | 14. | 14. |
| 14. | 13. | 13. | 13. | 12. | 12. | 11. | 11. | 11. | 11. |
| 10. | 9. | 8. | 8. | 8. | 7. | 7. | 7. | 7. | 6. |
| 6. | 6. | 11. | 133. | 157. | 16. | 23. | 32. | 44. | 58. |
| 73. | 91. | 111. | 398. | 417. | 183. | 211. | 239. | 269. | 298. |
| 326. | 352. | 376. | 497. | 501. | 434. | 449. | 461. | 471. | 474. |
| 485. | 490. | 494. | 497. | 504. | 504. | 509. | 515. | 523. | 534. |
| 548. | 565. | 587. | 616. | 655. | 707. | 778. | 873. | 1001. | 1168. |
| 1374. | 1610. | 1811. | 2152. | 2449. | 2759. | 3076. | 3397. | 3717. | 4032. |
| 4336. | 4624. | 4884. | 5126. | 5330. | 5498. | 5629. | 5788. | 5975. | 6182. |
| 5764. | 5707. | 5626. | 5416. | 5291. | 5174. | 5051. | 4928. | 4807. | 4686. |
| 4684. | 4572. | 4459. | 4349. | 4242. | 4139. | 4039. | 3942. | 3849. | 3759. |
| 3672. | 3547. | 3506. | 3428. | 3352. | 3274. | 3208. | 3139. | 3073. | 3009. |
| 2444. | 2387. | 2324. | 2272. | 2260. | 2222. | 2185. | 2150. | 2115. | 2081. |
| 2425. | 2382. | 2340. | 2300. | 2260. | 2222. | 2185. | 2150. | 2115. | 2081. |
| 2048. | 2015. | 1984. | 1954. | 1924. | 1896. | 1868. | 1840. | 1814. | 1788. |
| 1763. | 1738. | 1714. | 1691. | 1668. | 1645. | 1623. | 1601. | 1580. | 1559. |
| 1539. | 1519. | 1499. | 1476. | 1451. | 1426. | 1401. | 1377. | 1353. | 1330. |
| 1307. | 1285. | 1263. | 1241. | 1220. | 1199. | 1174. | 1158. | 1137. | 1117. |
| 1095. | 1073. | 1049. | 1024. | 998. | 972. | 944. | 917. | 888. | 860. |
| 831. | 802. | 773. | 744. | 715. | 687. | 658. | 630. | 602. | 575. |
| 544. | 521. | 495. | 470. | 446. | 422. | 399. | 377. | 355. | 334. |
| 314. | 295. | 276. | 258. | 241. | 225. | 209. | 193. | 178. | 163. |
| 149. | 136. | 122. | 110. | 98. | 88. | 79. | 71. | 63. | 56. |
| 50. | 45. | 40. | 36. | 32. | 29. | 26. | 23. | 21. | 19. |
| 17. | 15. | 14. | 12. | 11. | 10. | 9. | 8. | 7. | 7. |
| 5. | 5. | 4. | 4. | 4. | 4. | 3. | 3. | 3. | 3. |
| 2. | 2. | 2. | 2. | 2. | 2. | 2. | 2. | 2. | 2. |
| 1. | 1. | 1. | 1. | 1. | 1. | 1. | 1. | 1. | 1. |
| 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. | 0. |

| | | | | | | | | | |
|-------|------|------|------|------|------|------|------|------|------|
| STAGE | | | | | | | | | |
| 4.4 | 4.8 | 4.8 | 4.8 | 4.9 | 4.9 | 4.9 | 4.9 | 4.9 | 4.9 |
| 4.5 | 4.9 | 4.9 | 4.9 | 4.9 | 4.9 | 4.9 | 4.9 | 4.9 | 4.9 |
| 4.6 | 4.8 | 4.8 | 4.8 | 4.8 | 4.8 | 4.8 | 4.8 | 4.8 | 4.8 |
| 4.4 | 4.8 | 4.8 | 4.8 | 4.9 | 4.9 | 4.9 | 4.9 | 4.9 | 4.9 |
| 5.6 | 5.6 | 5.7 | 5.8 | 6.0 | 6.2 | 6.3 | 6.5 | 6.7 | 6.9 |
| 7.0 | 7.1 | 7.3 | 7.4 | 7.5 | 7.6 | 7.6 | 7.7 | 7.7 | 7.8 |
| 7.4 | 7.4 | 7.4 | 7.4 | 7.9 | 7.9 | 7.9 | 7.9 | 8.0 | 8.0 |
| 4.1 | 4.1 | 4.2 | 4.3 | 8.5 | 8.7 | 9.0 | 9.3 | 9.7 | 10.2 |
| 10.8 | 11.4 | 12.1 | 12.6 | 13.5 | 14.2 | 14.9 | 15.6 | 16.2 | 16.8 |
| 17.4 | 17.9 | 18.3 | 18.7 | 19.1 | 19.4 | 19.6 | 19.7 | 19.8 | 19.8 |
| 19.4 | 19.7 | 19.6 | 19.4 | 19.2 | 19.0 | 18.8 | 18.6 | 18.4 | 18.2 |

| | | | | | | | | | |
|------|------|------|------|------|------|------|------|------|------|
| 18.0 | 17.8 | 17.6 | 17.4 | 17.2 | 17.0 | 16.8 | 16.6 | 16.5 | 16.3 |
| 16.1 | 15.9 | 15.8 | 15.6 | 15.5 | 15.3 | 15.2 | 15.0 | 14.9 | 14.8 |
| 14.6 | 14.5 | 14.4 | 14.2 | 14.1 | 14.0 | 13.9 | 13.8 | 13.7 | 13.6 |
| 13.5 | 13.4 | 13.3 | 13.2 | 13.1 | 13.0 | 12.9 | 12.8 | 12.7 | 12.6 |
| 12.6 | 12.5 | 12.4 | 12.3 | 12.3 | 12.2 | 12.1 | 12.0 | 12.0 | 11.9 |
| 11.8 | 11.7 | 11.7 | 11.6 | 11.5 | 11.5 | 11.5 | 11.4 | 11.4 | 11.3 |
| 11.2 | 11.2 | 11.1 | 11.1 | 11.0 | 10.9 | 10.9 | 10.8 | 10.7 | 10.7 |
| 10.6 | 10.5 | 10.5 | 10.4 | 10.4 | 10.3 | 10.2 | 10.2 | 10.1 | 10.1 |
| 10.0 | 9.9 | 9.8 | 9.8 | 9.7 | 9.6 | 9.5 | 9.4 | 9.3 | 9.2 |
| 9.1 | 9.0 | 8.9 | 8.8 | 8.7 | 8.6 | 8.5 | 8.4 | 8.3 | 8.2 |
| 8.1 | 7.9 | 7.8 | 7.7 | 7.6 | 7.5 | 7.4 | 7.3 | 7.2 | 7.1 |
| 6.9 | 6.8 | 6.7 | 6.6 | 6.5 | 6.4 | 6.3 | 6.2 | 6.1 | 6.0 |
| 5.9 | 5.9 | 5.8 | 5.7 | 5.6 | 5.5 | 5.4 | 5.4 | 5.3 | 5.3 |
| 5.2 | 5.2 | 5.1 | 5.1 | 5.0 | 5.0 | 5.0 | 5.0 | 4.9 | 4.9 |
| 4.9 | 4.9 | 4.9 | 4.9 | 4.8 | 4.8 | 4.8 | 4.8 | 4.8 | 4.8 |
| 4.8 | 4.8 | 4.8 | 4.8 | 4.8 | 4.8 | 4.8 | 4.8 | 4.8 | 4.8 |
| 4.8 | 4.8 | 4.8 | 4.8 | 4.8 | 4.8 | 4.8 | 4.8 | 4.8 | 4.8 |
| 4.8 | 4.8 | 4.8 | 4.8 | 4.8 | 4.8 | 4.8 | 4.8 | 4.8 | 4.8 |

PEAK OUTFLOW IS 40266. AT TIME 50.00 HOURS

| | |
|--------------|----------|
| PEAK | 40266. |
| CFS | 1140. |
| CMS | 38358. |
| INCHES | 1086. |
| AC-FT | 5.80 |
| THOUS CU M | 147.37 |
| | 19021. |
| | 23462. |
| 6-HOUR | 26569. |
| 24-HOUR | 752. |
| 72-HOUR | 321. |
| TOTAL VOLUME | 11333. |
| | 1664479. |
| | 47144. |
| | 20.99 |
| | 533.03 |
| | 68797. |
| | 84459. |

SH 27

PEAK FLOW AND STORAGE (END OF PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
 FLOWS IN CUBIC FEET PER SECOND (CUBIC METERS PER SECOND)
 AREA IN SQUARE MILES (SQUARE KILOMETERS)

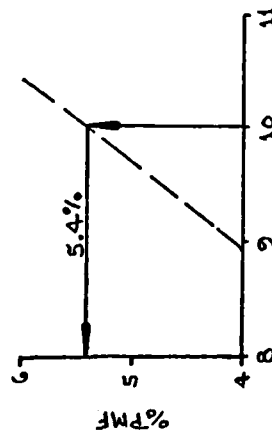
| OPERATION | STATION | AREA | PLAN | RATIOS APPLIED TO FLOWS | | | | | | | | |
|---------------|---------|-----------|------|-------------------------|----------|----------|----------|-----------|-----------|-----------|-----------|------------|
| | | | | RATIO 1 | RATIO 2 | RATIO 3 | RATIO 4 | RATIO 5 | RATIO 6 | RATIO 7 | RATIO 8 | RATIO 9 |
| | | | | .02 | .04 | .06 | .08 | .10 | .25 | .50 | .75 | 1.00 |
| HYDROGRAPH AT | INFLOW | 61.50 | 1 | 830. | 1660. | 2490. | 3319. | 4149. | 10373. | 20746. | 31119. | 41492. |
| | | (159.28) | (| 23.50) | (47.00) | (70.50) | (93.99) | (117.49) | (293.73) | (587.47) | (881.20) | (1174.93) |
| ROUTED TO | OUTFLOW | 61.50 | 1 | 559. | 988. | 1592. | 2567. | 3495. | 9872. | 20073. | 30186. | 40266. |
| | | (159.28) | (| 15.82) | (27.98) | (45.08) | (72.69) | (98.97) | (279.55) | (568.39) | (854.78) | (1140.20) |

SH 28

SUMMARY OF DAM SAFETY ANALYSIS

PLAN 1

| | ELEVATION STORAGE OUTFLOW | INITIAL VALUE 4.75 0. 0. | SPILLWAY CREST 4.75 0. 0. | TOP OF DAM 10.00 1099. 1190. | | | |
|--------------------|----------------------------------|-----------------------------------|------------------------------------|---------------------------------------|-------------------------------|---------------------------------|-----------------------------|
| RATIO OF PMF | MAXIMUM RESERVOIR W.S.ELEV | MAXIMUM DEPTH OVER DAM | MAXIMUM STORAGE AC-FT | MAXIMUM OUTFLOW CFS | DURATION OVER TOP HOURS | TIME OF MAX OUTFLOW HOURS | TIME OF FAILURE HOURS |
| .02 | 6.95 | 0.00 | 315. | 559. | 0.00 | 55.00 | 0.00 |
| .04 | 8.94 | 0.00 | 774. | 988. | 0.00 | 56.50 | 0.00 |
| .06 | 10.42 | .42 | 1243. | 1592. | 12.00 | 56.00 | 0.00 |
| .08 | 10.99 | .99 | 1446. | 2567. | 19.00 | 53.50 | 0.00 |
| .10 | 11.42 | 1.42 | 1603. | 3495. | 23.50 | 52.00 | 0.00 |
| .25 | 13.54 | 3.54 | 2458. | 9872. | 39.00 | 50.50 | 0.00 |
| .50 | 16.00 | 6.00 | 3615. | 20073. | 44.50 | 50.00 | 0.00 |
| .75 | 18.02 | 8.02 | 4707. | 30186. | 52.50 | 50.00 | 0.00 |
| 1.00 | 19.81 | 9.81 | 5788. | 40266. | 55.50 | 50.00 | 0.00 |

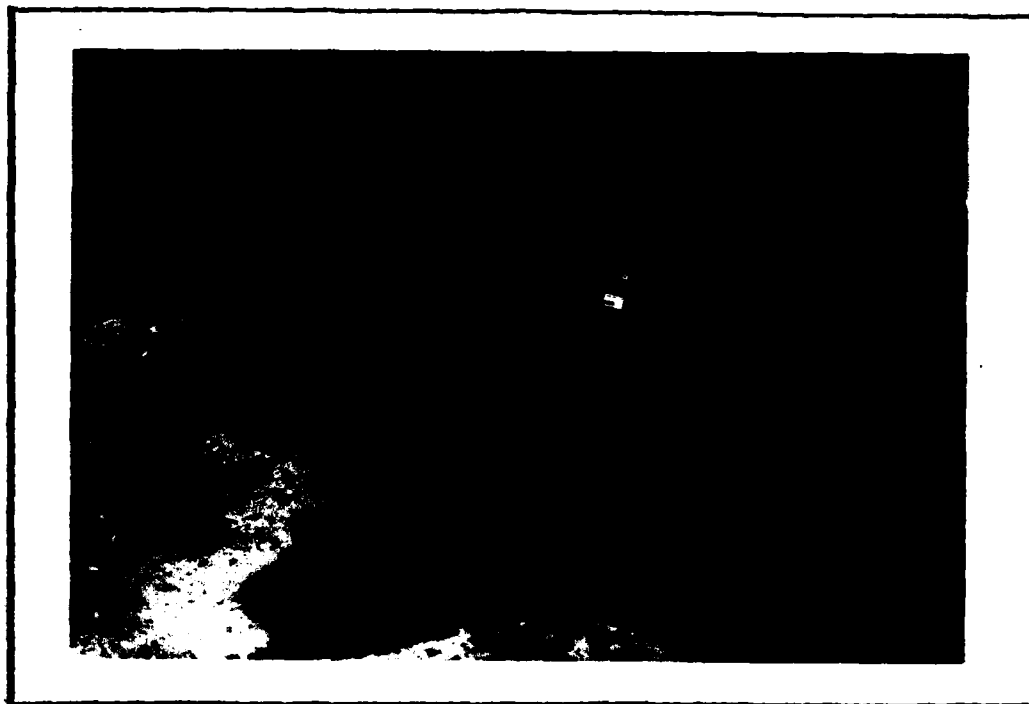


SH29

APPENDIX

D

Photographs



ERODED SECTION
NEAR UPSTREAM EDGE OF CREST
9-27-79



BREACHED SECTION THROUGH HIGHWAY
NEAR DOWNSTREAM EDGE OF CREST
9-27-79

D-1



PORTION OF WEIR AND STOPLOG BAY
9-27-79



HIGHWAY ACROSS TOP OF EMBANKMENT
9-27-79



ERODED UPSTREAM SLOPE
TO LEFT OF SPILLWAY SECTION
9-27-79



OVERGROWTH ON DOWNSTREAM SLOPE OF DAM
9-27-79



HOUSES IN DOWNSTREAM DAMAGE AREA
9-27-79



TEMPORARY BRIDGE
ON DOWNSTREAM SIDE OF THE CREST
LOOKING TOWARD THE INDIAN RIVER
9-27-79

APPENDIX

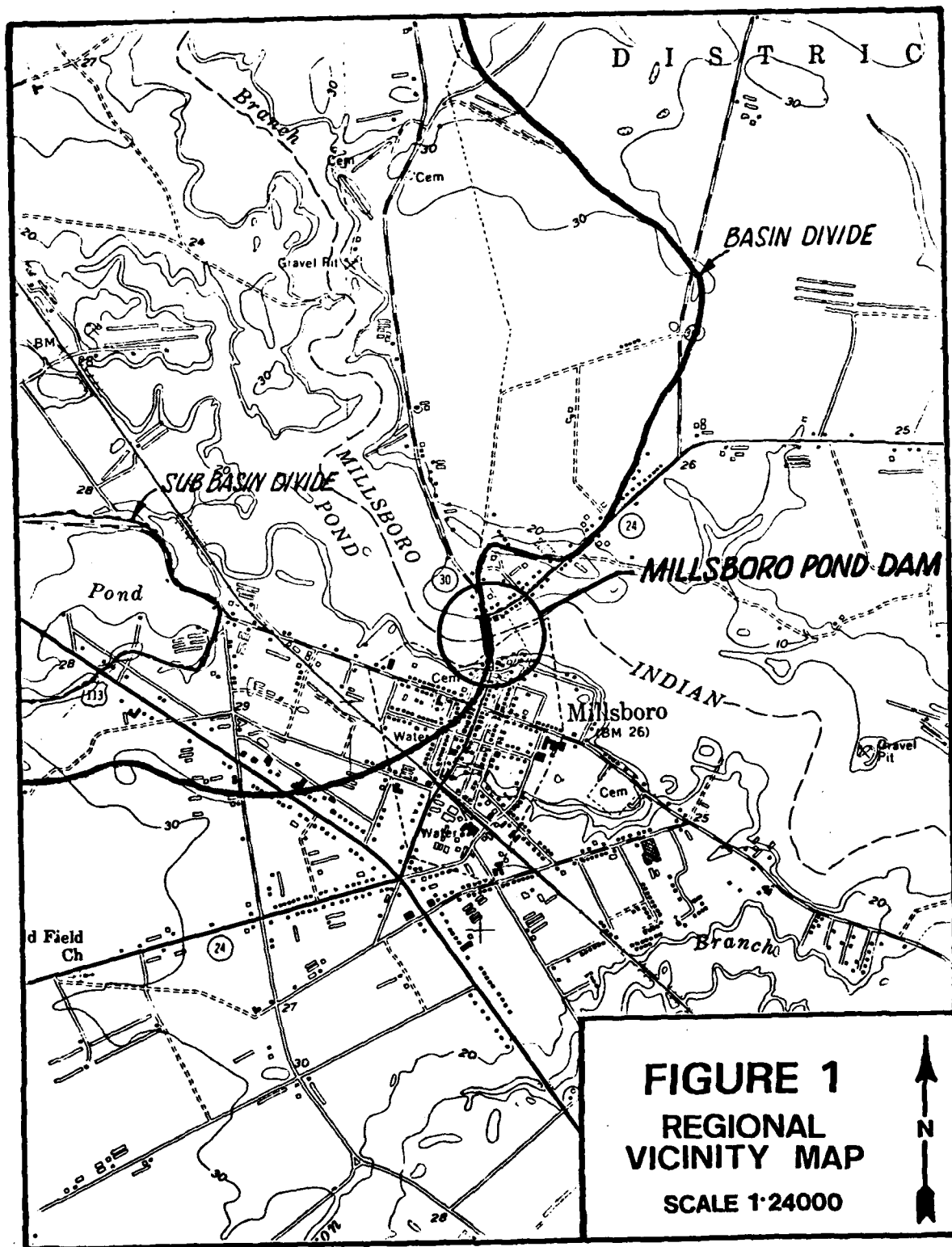
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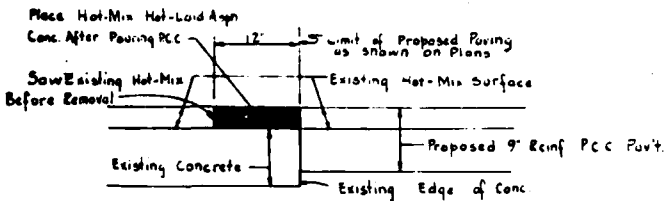
Drawings

TABLE OF CONTENTS

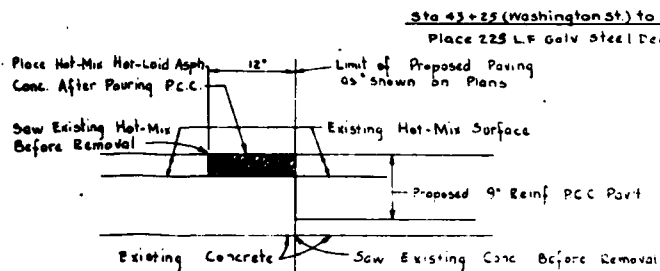
APPENDIX E

| | |
|---|----------|
| REGIONAL VICINITY MAP | FIGURE 1 |
| HIGHWAY BRIDGE PLAN AND ELEVATION | FIGURE 2 |
| SPILLWAY, STOPLOG GATES, AND BRIDGE OPENING | FIGURE 3 |
| SPILLWAY AND BRIDGE DETAILS | FIGURE 4 |
| GATE BRIDGE AND STEEL DETAILS | FIGURE 5 |





JOINT DETAIL "A"



JOINT DETAIL "B"

PAVING SYMBOLS

- 9" Reinf. Cement Conc. Pavement on 6" Select Borrow.
- Bituminous Surface Treatment on 6" Select Borrow.

PUBLIC UTILITIES

Diamond State Telephone Co. D.S.T. 0.00
 Delaware Power & Light Co. D.P.L. 0.00
 Rural Electrification Assoc. R.E.A. 0.00

G.M. No. 1

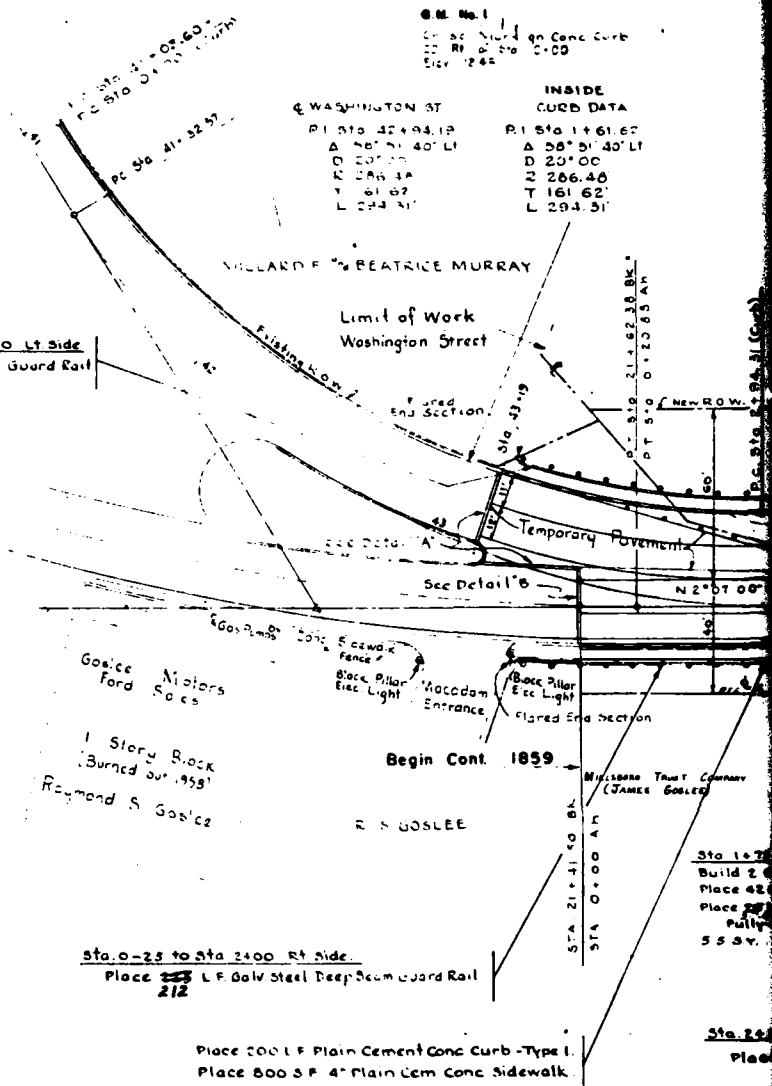
1. 20' 0" 0.00
 2. 10' 0" 0.00
 3. 10' 0" 0.00

E WASHINGTON ST

P.I. Sta. 42+94.12
 Δ 20° 51' 40" L
 D 207.00
 E 207.00
 T 161.62
 L 204.51

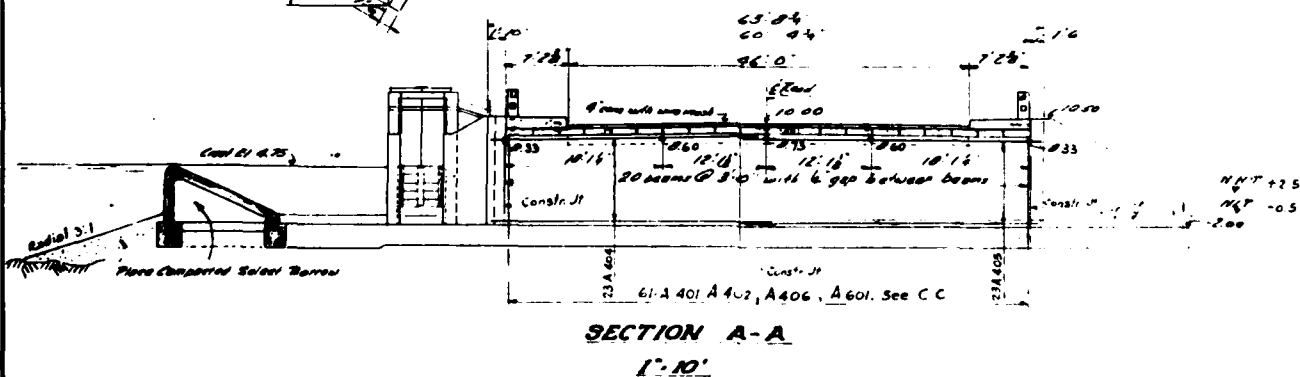
INSIDE CURB DATA

P.I. Sta. 1+61.67
 Δ 20° 51' 40" L
 D 207.00
 E 207.00
 T 161.62
 L 204.51

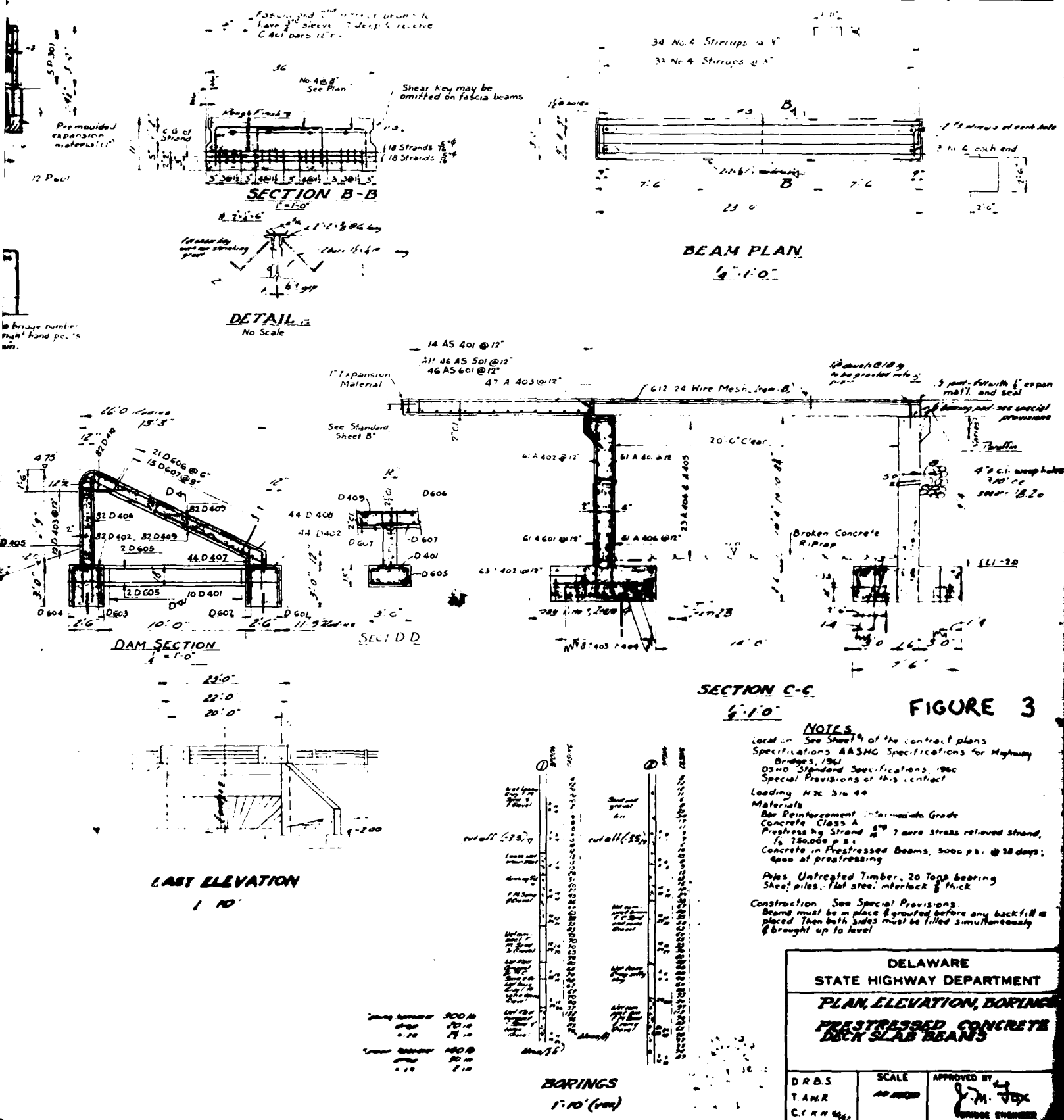


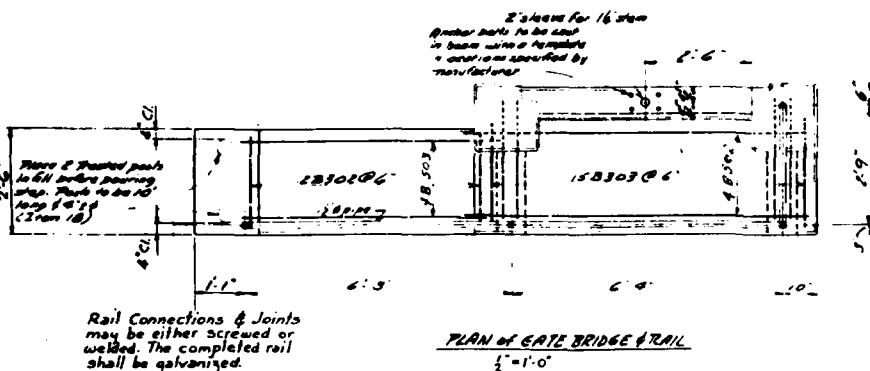
Begin Contract 1859

DATUM - 20

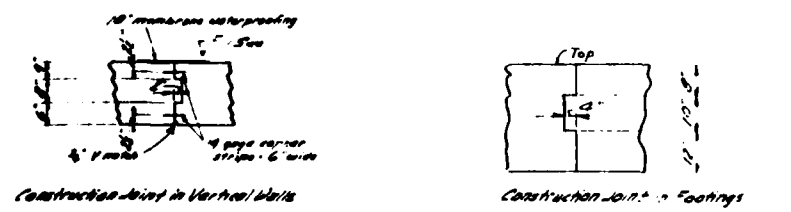
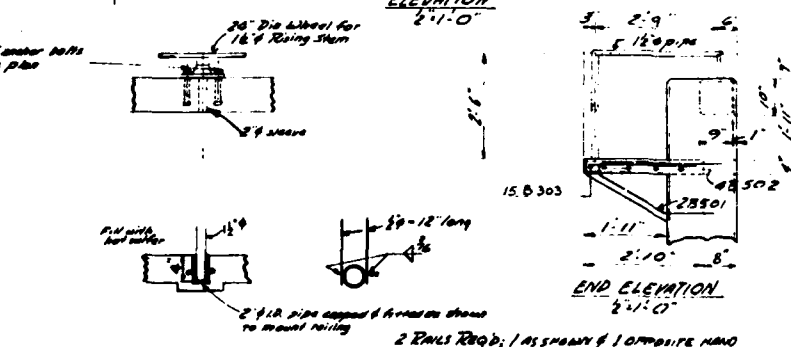
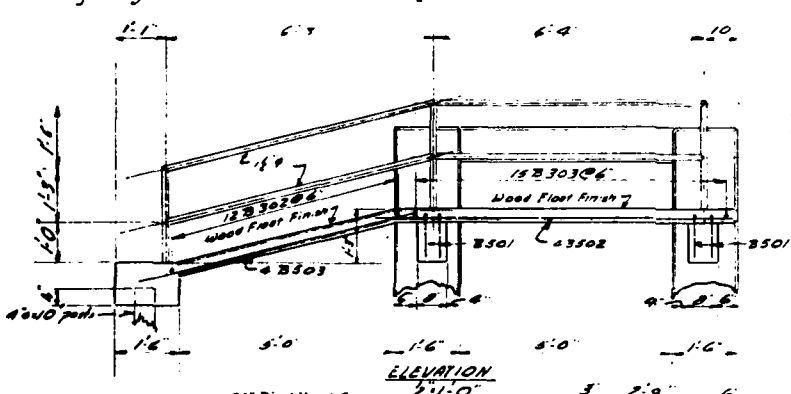


MILLSBORO POND DAM & BRIDGE.

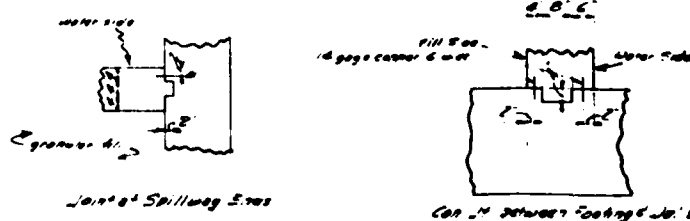
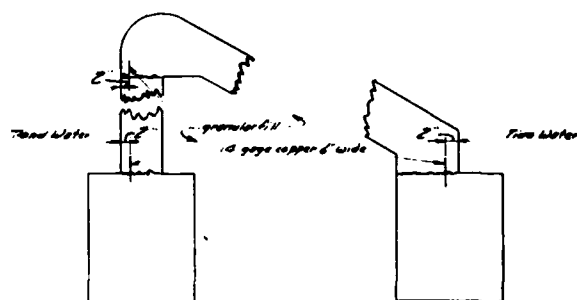




Rail Connections & Joints
may be either screwed or
welded. The completed rail
shall be galvanized.



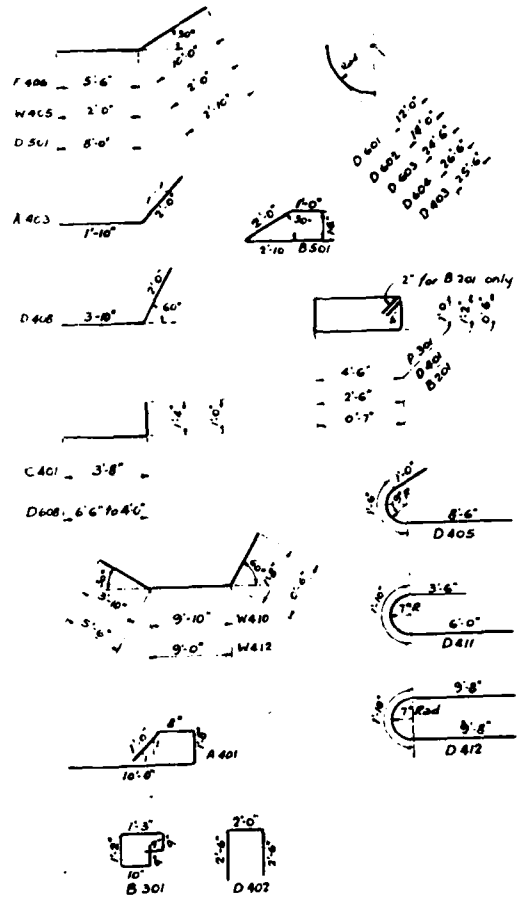
| BILL OF BAR REINFOR | | | | | | | | | | | |
|---------------------|-------|-----|--------|--------|------|----------|----------------|--------|------|------|--------|
| LOCATION | MARK | NO. | SIZE | LENGTH | UNIT | QUANTITY | LOCATION | MARK | NO. | SIZE | LENGTH |
| ABUT- MENTS | A 4 | 122 | 13' 4" | B | | | WINGS | W 401 | 2+0 | | |
| | A 402 | 122 | 4' 0" | S | | | | W 402 | 4+7 | | |
| | A 403 | 94 | 3' 10" | B | | | | W 403 | 20 | | |
| | A 404 | 46 | 3' 0" | S | | | | W 404 | 4 | | |
| | A 405 | 46 | 3' 4" | S | | | | W 405 | 88 | | |
| | A 406 | 122 | 4' 0" | S | | | | W 406 | 30 | | |
| | A 601 | 122 | 7' 0" | S | | | | W 407 | 2+14 | | |
| | | | | | | | | W 408 | 44 | | |
| | | | | | | | | W 409 | 90 | | |
| | | | | | | | | W 410 | 2+5 | | |
| FOOTING | F 401 | 46 | 9' 0" | S | | | W 411 | W 411 | 22 | | |
| | F 402 | 122 | 7' 0" | S | | | | W 412 | 24 | | |
| | F 403 | 16 | 3' 4" | S | | | | | | | |
| | F 404 | 16 | 3' 0" | S | | | | | | | |
| | F 405 | 40 | 19' 0" | S | | | | | | | |
| | F 406 | 26 | 15' 6" | B | | | | | | | |
| | F 407 | 4+5 | 8' 0" | S | | | | W 601 | 2+14 | | |
| | F 408 | 4 | 14' 6" | S | | | | W 602 | 2+12 | | |
| | F 409 | 2+5 | 10' 3" | S | | | | W 603 | 2+13 | | |
| | F 410 | 44 | 4' 6" | S | | | | W 604 | 2+9 | | |
| APPROACH SLAB | F 411 | 4+7 | 14' 6" | S | | | W 605 | W 605 | 2+10 | | |
| | F 412 | 4 | 5' 9" | S | | | | W 606 | 2+8 | | |
| | F 413 | 4 | 3' 5" | S | | | | W 607 | 2+8 | | |
| | F 414 | 2+6 | 4' 3" | S | | | | W 608 | 2+11 | | |
| | F 415 | 12 | 12' 0" | S | | | | W 609 | 2+6 | | |
| | F 416 | 3 | 4' 0" | S | | | | W 610 | 2+5 | | |
| | F 417 | 4+3 | 8' 0" | S | | | CURB & RAIL | A 5401 | 56 | | |
| | F 418 | 4 | 3' 4" | S | | | | A 5501 | 92 | | |
| | F 419 | 4+5 | 4' 3" | S | | | | A 5601 | 92 | | |
| | F 420 | 4+5 | 4' 3" | S | | | | | | | |
| CURB & RAIL | F 421 | 52 | 9' 0" | S | | | CURB & RAIL | C 401 | 92 | | |
| | F 422 | 44 | 10' 6" | S | | | | C 402 | 14 | | |
| | F 423 | 44 | 14' 6" | S | | | | P 301 | 20 | | |
| | F 424 | 2+5 | 14' 6" | S | | | | P 401 | 48 | | |
| | | | | | | | | R 802 | 16 | | |



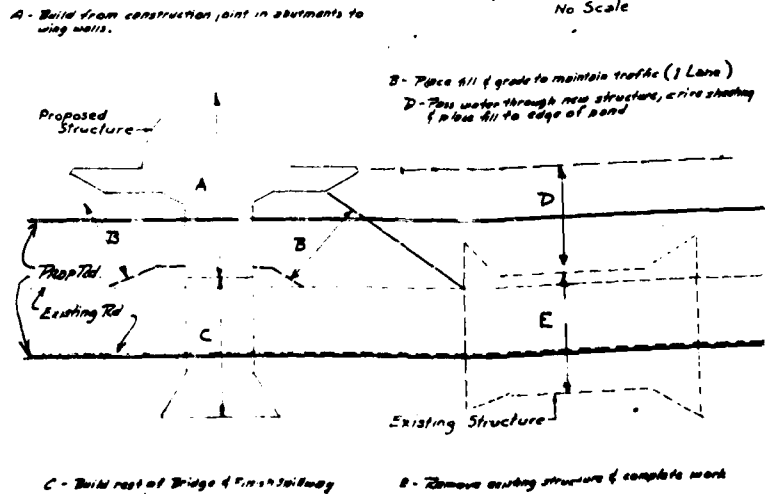
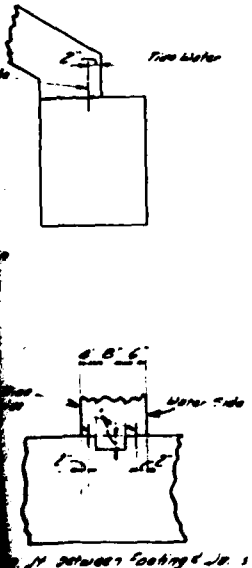
CONSTRUCTION JOINT DETAILS
No Scale

MILLSBORO POND DAM & BRIDGE

| BILL OF BAR REINFORCEMENT | | | | | | | | | |
|---------------------------|------|-----|---------|--------|-----|-------------|------|-----|--------|
| LOCATION | MARK | NO. | SIZE | LENGTH | SHA | LOCATION | MARK | NO. | SIZE |
| WINGS | | | | | | SPILLWAY | | | |
| W401 | 2x19 | 4 | 12-3/4" | S | | D401 | 50 | 4 | 8-0" |
| W402 | 4-7 | | 12-3/4" | S | | D402 | 126 | | 7-0" |
| W403 | 20 | | 18-3" | S | | D403 | 24 | | 41-0" |
| W404 | 4 | | 19-0" | S | | D404 | 24 | | 2-6" |
| W405 | 88 | | 4-0" | B | | D405 | 82 | | 11-0" |
| W406 | 30 | | 15-0" | S | | D406 | 82 | | 9-0" |
| W407 | 2x16 | | 10-4" | S | | D407 | 44 | | 4-3" |
| W408 | 44 | | 15-0" | S | | D408 | 44 | | 5-40" |
| W409 | 40 | | 10-4" | S | | D409 | 164 | | 13-0" |
| W410 | 28 | | 15-4" | B | | D410 | 82 | | 3-6" |
| W411 | 22 | | 10-8" | S | | D411 | 28 | | 11-8" |
| W412 | 24 | | 15-0" | B | | D412 | 20 | | 21-2" |
| | | | | | | D501 | 4 | 5 | 10-10" |
| | | | | | | D601 | 4 | 6 | 20-0" |
| | | | | | | D602 | 4 | | 24-0" |
| | | | | | | D603 | 4 | | 50-6" |
| | | | | | | D604 | 4 | | 45-6" |
| | | | | | | D605 | 20 | | 14-6" |
| | | | | | | D606 | 5x21 | | 12-0" |
| | | | | | | D607 | 6x15 | | 12-0" |
| | | | | | | D608 | 2x21 | | 12-0" |
| | | | | | | D609 | 60 | | 12-6" |
| | | | | | | D610 | 4x13 | | 12-8" |
| | | | | | | B201 | 34 | 2 | 2-6" |
| | | | | | | B301 | 36 | 3 | 5-6" |
| | | | | | | B501 | 8 | 5 | 6-0" |
| | | | | | | B502 | 8 | 5 | 8-0" |
| | | | | | | B601 | 32 | 4 | 8-0" |
| | | | | | | B602 | 8 | 6 | 7-8" |
| | | | | | | B302 | 24 | 3 | 2-2" |
| | | | | | | B303 | 30 | 3 | 2-6" |
| | | | | | | B503 | 8 | 5 | 7-0" |
| | | | | | | GATE | | | |
| | | | | | | B201 | 34 | 2 | 2-6" |
| | | | | | | B301 | 36 | 3 | 5-6" |
| | | | | | | B501 | 8 | 5 | 6-0" |
| | | | | | | B502 | 8 | 5 | 8-0" |
| | | | | | | B601 | 32 | 4 | 8-0" |
| | | | | | | B602 | 8 | 6 | 7-8" |
| | | | | | | B302 | 24 | 3 | 2-2" |
| | | | | | | B303 | 30 | 3 | 2-6" |
| | | | | | | B503 | 8 | 5 | 7-0" |
| | | | | | | CURB & RAIL | | | |
| C401 | 92 | 4 | 5-0" | B | | | | | |
| C402 | 14 | 4 | 22-8" | S | | | | | |
| P301 | 20 | 3 | 11-8" | B | | | | | |
| P601 | 48 | 6 | 4-0" | S | | | | | |
| R602 | 16 | 8 | 15-6" | S | | | | | |



BAR BENDING DIAGRAMS
& DETAILING DIMENSIONS
No Scale



SUGGESTED CONSTRUCTION SEQUENCE

FIGURE 5

| | | |
|--------------------------------------|-------|-----------------------------------|
| DELAWARE STATE HIGHWAY DEPARTMENT | | |
| BILL OF BAR REINFORCEMENT | | |
| D.A.W.R. T.A.W.R. C.C.N.F. | SCALE | APPROVED BY <i>[Signature]</i> |

APPENDIX

F

Site Geology

SITE GEOLOGY

MILLSBORO POND DAM

Millsboro Pond Dam is located in the Coastal Plain physiographic province which is composed of unconsolidated sedimentary deposits. These beds form a wedge-shaped mass that is exposed at the fall line and thickens in a southeasterly direction towards the Atlantic Ocean. This wedge-shaped mass consists largely of unconsolidated clays, silts, sands, and gravels which reach a thickness of more than 8,000 feet in southeastern Delaware.

The soils in the Millsboro area are of the Chesapeake Group which consists mainly of bluish gray silt with quartz sand and some shell beds.

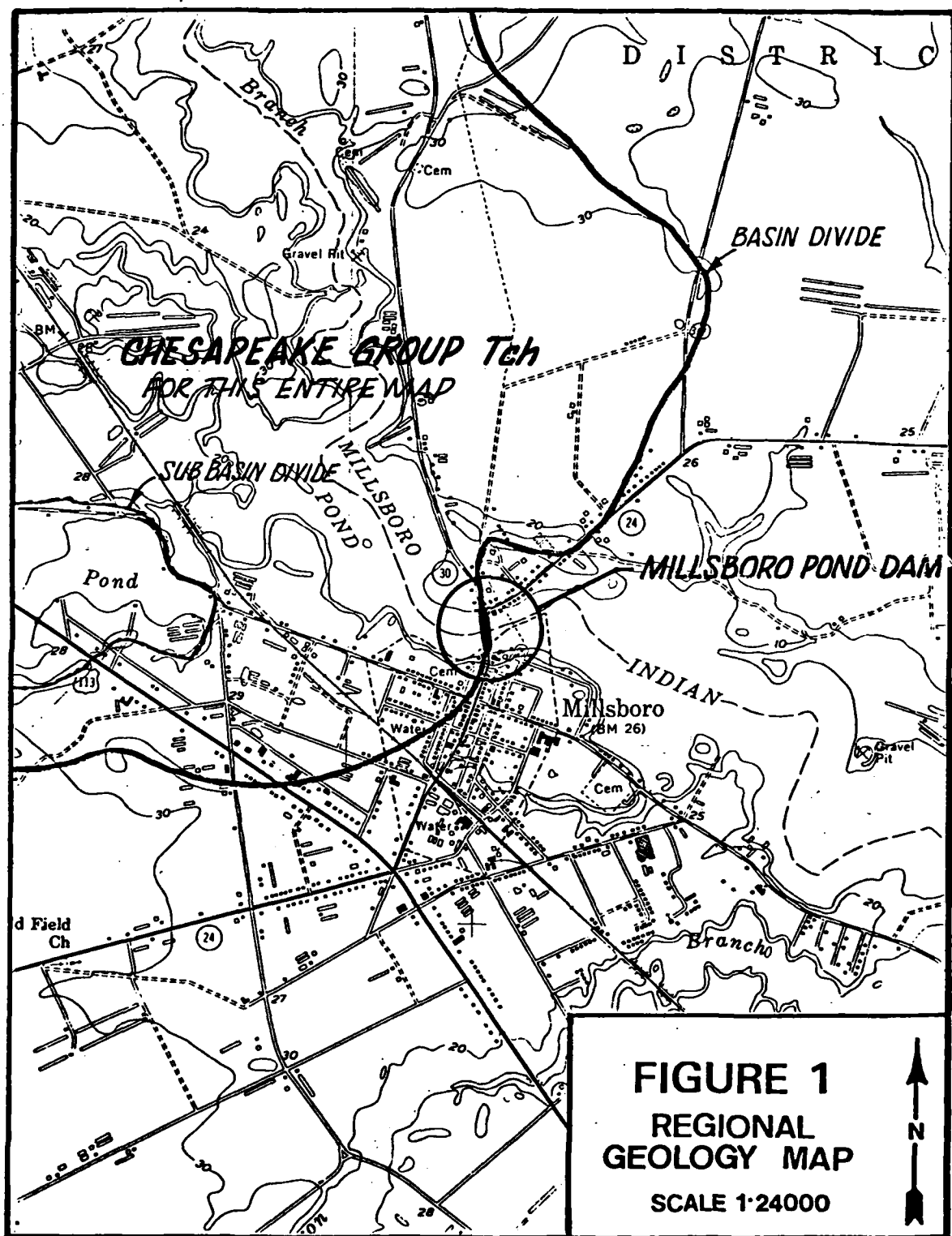


FIGURE 1
REGIONAL
GEOLOGY MAP
SCALE 1:24000

